EFFECTS OF LOW DOSE DEXMEDETOMIDINE INFUSION ON HAEMODYNAMIC STRESS RESPONSE,SEDATION AND POST OPERATIVE ANALGESIA REQUIREMENT IN PATIENTS UNDERGOING LAPAROSCOPIC SURGERIES

Dissertation Submitted in partial fulfillment of

M.D DEGREE EXAMINATION

M.D ANAESTHESIOLOGY- BRANCH X

CHENGALPATTU MEDICAL COLLEGE, CHENGALPATTU

THE TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY

CHENNAI, TAMILNADU

APRIL 2017

CERTIFICATE BY THE HEAD OF INSTITUTION

This is to certify that this dissertation titled "EFFECTS OF LOW DOSE DEXMEDETOMIDINE INFUSION ON HAEMODYNAMIC STRESS RESPONSE, SEDATION AND POST OPERATIVE ANALGESIA REQUIREMENT IN PATIENTS UNDERGOING LAPAROSCOPIC SURGERIES" has been prepared by Dr. Jeremiah Kharshiing , under my supervision in the department of Anaesthesiology, Chengalpattu Medical College & Hospital, Chengalpattu during the academic period 2014-2017 and is being submitted to the Tamil Nadu D.R. M.G.R. Medical University, Chennai in partial fulfillment of the University regulation for the award of the Degree of Doctor of Medicine (Branch-X MD Anaesthesiology) and his dissertation is a bonafide work.

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DECLARATION BY THE CANDIDATE

I, Dr. Jeremiah Kharshiing solemnly declare that the dissertation titled "EFFECTS OF LOW DOSE DEXMEDETOMIDINE INFUSION ON HAEMODYNAMIC STRESS RESPONSE, SEDATION AND POST OPERATIVE ANALGESIA REQUIREMANT IN PATIENTS UNDERGOING LAPAROSCOPIC SURGERIES" is a bonafide work done by me in the Department of anaesthesiology, Chengalpattu Medical College & hospital, Chengalpattu, under the able guidance of Prof. J. REVATHY, M.D, D.A, Professor and HOD, Department of Anaesthesiology, Chengalpattu Medical College, Chengalpattu, after getting approval from ethical committee.

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INSTITUTIONAL ETHICAL COMMITTEE

CHENGALPATTU MEDICAL COLLEGE, CHENGALPATTU

Title of Work	:	Effects of low dose dexmedetomidine infusion on haemodynamic stress response, sedation and post operative analgesia requirement inpatients undergoing laparoscopic surgeries
Principal Investigator	:	Dr.Jeremiah Kharshiing
Designation	:	2nd Year MD Anaesthesia
Co-Investigators	:	1. Dr.N.Baskar,MD Associate Professor of Anaesthesia
Department	:	Anaesthesia

The request for an approval From the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 29.02.2016 at the Medical Education Unit, Government Chengalpattu Medical College, Chengalpattu at 11.00 PM.

The Members of the committee, the Secretary and the Chairman are pleased to approve the proposed work mentioned above, submitted by the principal investigator.

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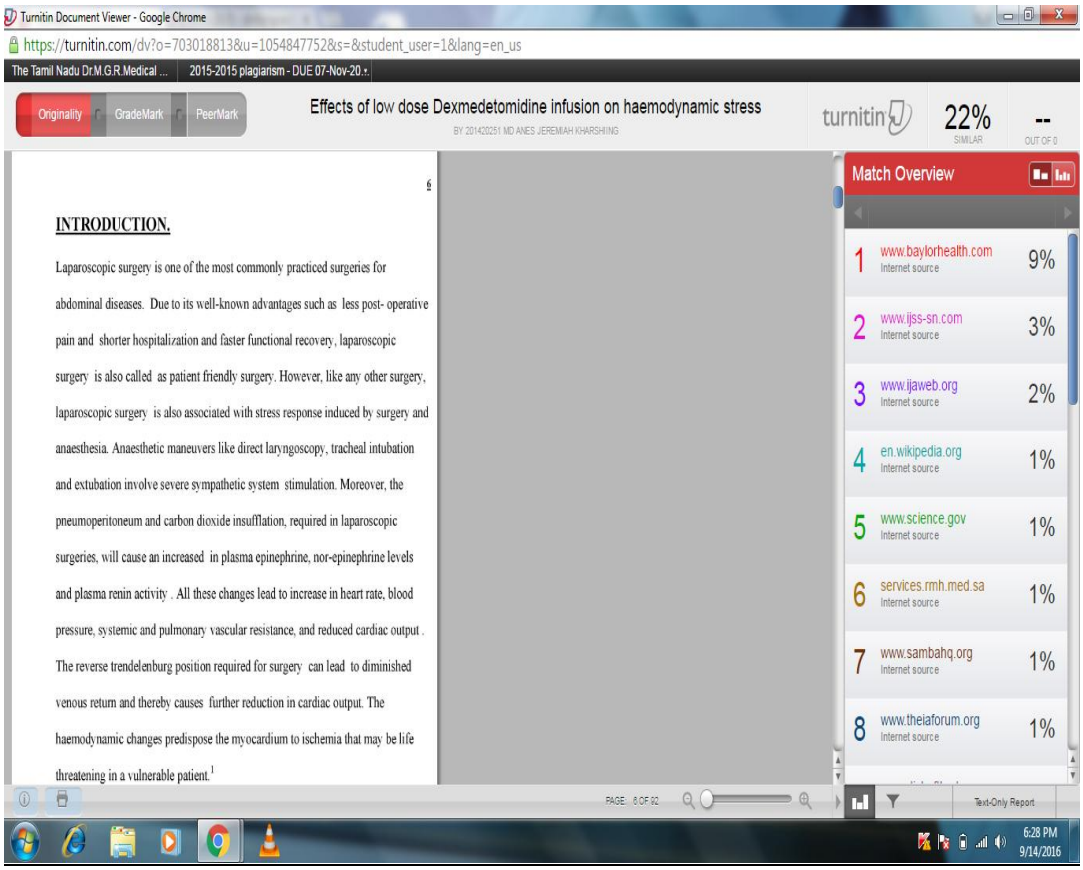
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INTRODUCTION.
Laparoscopic surgery is one of the most commonly practiced surgeries for abdominal diseases. Due to its well-known advantages such as less post- operative pain and shorter hospitalization and faster functional recovery, laparoscopic surgery is also called as patient friendly surgery. However, like any other surgery, laparoscopic surgery is also associated with stress response induced by surgery and anaesthesia. Anaesthetic maneuvers like direct laryngoscopy, tracheal intubation and extubation involve severe sympathetic system stimulation. Moreover, the pneumoperitoneum and carbon dioxide insufflation, required in laparoscopic surgeries, will cause an increased in plasma epinephrine, nor-epinephrine levels and plasma renin activity . All these changes lead to increase in heart rate, blood pressure, systemic and pulmonary vascular resistance, and reduced cardiac output . The reverse trendelenburg position required for surgery can lead to diminished venous return and thereby causes further reduction in cardiac output. The haemodynamic changes predispose the myocardium to ischemia that may be life threatening in a vulnerable patient.[1]
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CONTENTS

INTRODUCTION

Laparoscopic surgery is one of the most commonly practiced surgeries for abdominal diseases. Due to its well-known advantages such as less post- operative pain and shorter hospitalization and faster functional recovery, laparoscopic surgery is also called as patient friendly surgery. However, like any other surgery, laparoscopic surgery is also associated with stress response induced by surgery and anaesthesia. Anaesthetic maneuvers like direct laryngoscopy, tracheal intubation and extubation involve severe sympathetic system stimulation. Moreover, the pneumoperitoneum and carbon dioxide insufflation, required in laparoscopic surgeries, will cause an increased in plasma epinephrine, nor-epinephrine levels and plasma renin activity . All these changes lead to increase in heart rate, blood pressure, systemic and pulmonary vascular resistance, and reduced cardiac output . The reverse trendelenburg position required for surgery can lead to diminished venous return and thereby causes further reduction in cardiac output. The haemodynamic changes predispose the myocardium to ischemia that may be life threatening in a vulnerable patient.[1]

Modern anaesthesia practices, therefore, plan to prevent sympathetic discharge and Provide the stability in the haemodynamic system during the perioperative period. The various agents such as opioid analgesics, benzodiazepines, beta blockers, calcium channel blockers, vasodilators have been used to attenuate the response. For the last few years, a great enthusiasm, has been shown toward the use of alpha 2 agonists in anaesthesia practice because of the anxiolytic, sedative, sympathetic and analgesic properties.

Dexmedetomidine, introduced in 1999 for human use, is a selective α2 agonist that shows 8 times more affinity for alpha 2 adrenergic receptors as compared to clonidine and possesses all the properties of alpha 2 agonist without respiratory depression. Intravenous use of Dexmedetomidine in the perioperative period had been found to decrease serum catecholamine levels up to 90%, to blunt the haemodynamic response to laryngoscopy, tracheal intubation, pneumoperitoneum and extubation, to provide sedation without respiratory depression and to decrease post-operative analgesic requirements.

The objective aim of this study was, therefore, to compare the effects of low dose Dexmedetomidine infusion on haemodynamic response to critical incidences like laryngoscopy, endotracheal intubation, creation of pneumoperitoneum and extubation in patients undergoing laparoscopic surgeries. Moreover, the effects of Dexmetedomidine-on extubation time, sedation levels, the post-operative analgesia requirements, and the occurrence of adverse effects were also evaluated[2].

TITLE

Effects of low dose Dexmedetomidine infusion on haemodynamic stress response, sedation and post operative analgesia requirement in patients undergoing laparoscopic surgeries.

AIM AND OBJECTIVE

To compare the effects of low dose 0.2 mic/kg/hr & 0.4 mic/kg/hr Dexmedetomidine infusion on

1) Haemodynamic stress response to maneuvers like;

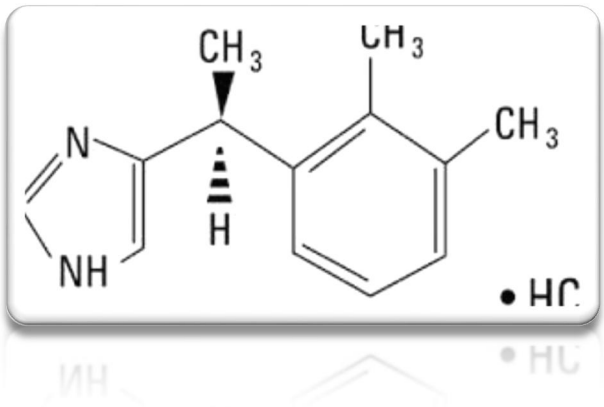
   - Laryngoscopy
   - Endotracheal intubation
   - Creation of pneumoperitoneum
   - Extubation

2) Sedation

3) The postoperative analgesia requirement in patients undergoing laparoscopic surgeries.

PHARMACOLOGY OF DEXMEDETOMIDINE

Dexmedetomidine is a selective alpha-2 agonist which has sedative and analgesic properties.



Structure of Dexmedetomidine.

50 microgram 0.5 ml ampoule Dexmedetomidine

HISTORY

Dexmedetomidine was approved by the Food and Drug Administration (FDA) (1999) as a short term sedative and analgesic (less than 24 hours) for critically ill or injured people on mechanical ventilation in the intensive care unit (ICU) . The rationale for its use short term was due to concerns over withdrawal side effects, such as rebound high blood pressure. However the side effects such as rebound hypertension and withdrawal symptoms have not shown to be consistent in the various observed studies. In the year 2008 the FDA has expanded its indication to include non-intubated people requiring sedation for surgical or non-surgical procedures, such as colonoscopy [3].

PHARMACODYNAMICS:

Dexmedetomidine is selective for alpha 2 receptors but at higher doses it also has alpha 1 action. The sedative properties of Dexmedetomidine are mediated through action on post synaptic alpha 2 receptors in locus cerulus in brain and spinal cord Dexmedetomidine has also action on muscarinic, dopaminergic, adrenergic and serotonin receptors.

Actions of alpha 1 and alpha 2 recepters

	Alpha 1	Alpha 2
Function	Stimulation; Gland secretion, GITrelaxation, Vasoconstriction, Glycogenolysis	Vasoconstriction, Inhibition of transmitter release, decreased central sympathetic outflow, platelet aggretion.
Location	Post junctional: Skin, blood vessels, mucous membrane, pilomotor muscle, sweat gland and radial muscle of iris.	Prejunctional.
Agonist	Phenylephrine, Methoxamine	Clonidine , Dexmedetomidine
Antagonist	Prazoxin	Yohimbine , Atipamezole

PHARMACOKINETICS

Dexmedetomidine has a distribution half life of about 6 minutes and elimination half life of about 2 hours.The volume of distribution is 11.8 litres and it is highly protein bound .

METABOLISM

Dexmedetomidine is predominantly metabolized in the liver into inactive metabolites. Metabolism occurs through glucoronidation and through cytochrome p450 pathways. Context sensitive half life of Dexmedetomidine is 4 to 10 minutes.

Elimination

Elimination of Dexmedetomidine takes place through the kidneys and hence Dexmedetomidine should be cautiously used in patients with severe renal impairment.

INDICATIONS

- Dexmedetomidine is principally used for sedation of mechanically ventilated patients in the ICU. Dexmedetomidine can produced sedation without significant respiratory depression[4].

- Dexmedetomidine can also be used for sedation during surgical procedures for maintaining the haemodynamic stability[5].

- Dexmedetomidine can be used for rapid opioid detoxification, cocaine withdrawal and intolerance after prolonged use of benzodiazepines and opioids[5].

- Dexmedetomidine can also be used in awake fibre optic intubation,awake craniotomies with functional testing and electrocorticography and in awake carotid endarterectomies with stable haemodynamics[6].

CONTRAINDICATIONS

- Contraindicated in patients with severe hepatic and renal dysfunction.
- Patients with known hypersensitivity to dexmedetomidine.

DOSE

- Dexmedetomidine is administered at a loading dose of 1 microgram/ kg to run over a period of 10 minutes followed by infusion at a rate of 0.2-0.8 micrograms/kg/hour .
- Infusion dose can be increased by 0.1 microgram/ kg/hour every 5 minutes if adequate clinical response is not obtained.

Elderly patients are highly sensitive to Dexmedetomidine, hence the dose of Dexmedetomidine should be reduced. Effects of Dexmedetomidine can be antagonized by administration of atipamazole[7].

ADVERSE EFFECTS

The common adverse effects of Dexmedetomidine are

- Hypotension or hypertension
- Bradycardia
- Dryness of mouth
- Nausea

Other adverse effects include

- Fever, arrhythmias like atrial fibrillation, edema, myocardial infarction, pulmonary edema, speech disorders, diarrhoea, hyperkalemia, hyperglycemia, muscle weakness, paraesthesia, delirium, hallucinations, depression, urinary retention, hypoxia, hypercapnia, hypoventilation, pulmonary hypertension, pneumothorax, erythematous rashes and visual disturbances. Administration of Dexmedetomidine is associated with elevation of liver enzymes and decrease in prothrombin levels. Dexmedetomidine can produce withdrawal syndrome after discontinuation.

DRUG INTERACTIONS

It should be avoided in pregnancy and during labour and caesarean section. Dexmedetomidine should be avoided in nursing mothers as it is excreted in breast milk.Dexmedetomidine enhances the effects of anaesthetic agents such as hypnotics, sedatives and opioids. Hence, co-administration of these drugs with Dexmedetomidine results in decrease in dose requirement of these agents. Caution should be exercised during administration of Dexmedetomidine along with vasodilators and negative inotropic agents as it can worsen bradycardia and hypotension associated with Dexmedetomidine

PRECAUTIONS

Close monitoring of the patient with ECG, Pulse oximeter and Blood pressure monitoring should be done during administration of Dexmedetomidine.

Caution should be exercised while administering Dexmedetomidine to patients with pre-existing heart block, Congestive Cardiac Failure (CCF) and bradycardia.

Administration of a loading dose of Dexmedetomidine can be associated with transient hypertension[8]. This occurs due to action on alpha 1 receptors in blood vessels due to higher plasma concentration attained during administration of the loading dose. Rapid intravenous administration of Dexmedetomidine to individuals with high vagal tone can cause severe bradycardia and cardiac arrest. Treatment of bradycardia involves administration of anticholinergic agents such as atropine. Administration of Dexmedetomidine can cause dryness of eyes and hence patient`s eyes should be lubricated to prevent corneal dryness. Sudden discontinuation of Dexmedetomidine after prolonged infusion can cause withdrawal syndrome characterized by rebound hypertension, headache, agitation and nervousness. Hence infusion of Dexmedetomidine should be limited to less than 24 hours.

The patient should be adequately hydrated prior to administration of Dexmedetomidine to prevent hypotension. Treatment of hypotension includes stoppage of the infusion, elevation of the foot end of the patient and administration of vasopressors[9]

Pre-operative effects:

Dexmedetomidine possesses anxiolytic, sedative, analgesic, and sympatholytic properties ,and it is used for premedication, especially for patients susceptible to pre-operative and peri-operative stress. Clonidine was used for a very long time, to attenuate the sympathetic activation during the induction of anaesthesia, and it provided stability in the hemodynamic stress response. Dexmedetomidine seems to offer the same or in some cases more beneficial in properties. Both drugs were able to decrease the oxygen consumption in the intra-operative period (up to 8%) and in the post-operative period (up to 17%) [8]. The maximum heart rate was a decrease of more than 18% in both the treatment groups than in the placebo group[9].

As parent study shows that dexmedetomidine infusion started without loading dose has beneficial effects as mentioned above similarly I have done the same without deferring from it.

Intravenous or intramuscular administration of Dexmedetomidine reduced the requirement of the induction dose requirement of thiopentone in the group that received low doses up to 17% and 30% in a group that received high doses [9].

Dexmedetomidine potentiate the anesthetic effects of all intraoperative anesthetics, wheather it was given intravenously, volatile, or even regional block[10].

INTRAOPERATIVE EFFECTS

Alpha -2 adrenoceptor agonists had shown to attenuate stress-induced sympatho-adrenal responses . One of the goals of anaesthesia is to blunt the response of the patient from noxious sympathetic stimulation and hemodynamic changes during surgery. Dexmedetomidine has analgesic effects, increased the hemodynamic stability, and reduced the unwanted responses of tracheal intubation. There was evidence that Dexmedetomidine can alter the pharmacokinetics of intravenous

anaesthetic agents, by decreasing the cardiac output and interfering in alfentanil metabolism by inhibiting microsome enzymes P450 in the liver, but not the pharmacokinetics of inhaled agents such as isoflurane[10]. A report was given to the reduced need of isoflurane requirements in humans with dexmedetomidine was published in 1991[11].

In animals, the profound reduction of anesthetic requirements raised the question of the possibility that Alpha 2 -adrenoceptor agonists can be considered as anesthetic agent,when administered alone . It was subsequently shown that a central α_2-adrenergic C4 isoreceptor is the receptor that can mediate the anaesthetic response[12] . Possible anaesthetic effects have been suggested in humans also. Tracheal intubation has been associated with the significant increased of Mean arterial pressure, heart rate, catecholamine plasma concentrations. Dexmedetomidine causes the attenuation of the sympatho-adrenal system stimulation during tracheal intubation effectly, but cannot completely abolish the cardiovascular response.

Studies have shown that the analgesic properties of Dexmedetomidine can be used as the sole analgesic during and after minor surgery[12].The requirement of the opioid needed in the intra-operative period and also in the post-anesthesia care unit (PACU) are

reduced significantly by Dexmedetomidine. Moreover, the use of Dexmedetomidine in patients undergoing minor or major surgeries allowed a lower doses of anesthetics requirement that results in more rapid recovery from anesthesia and also a reduced need for rescue analgesic ; pain medication in the PACU, thereby reducing the length of stay[12].

There was one study that investigated the used of rocuronium as muscle relaxant along with Dexmedetomidine on the neuromuscular blockade[12] . Using a steady-state infusion with rocuronium, the authors had shown that increasing plasma concentrations of Dexmedetomidine resulted in further decreased muscle-force by using monitors such as mechanomyography[12]. Although these changes were statistically significant, but these finding were not considered clinically relevant by the investigators[12.]

Dexmedetomidine is associated with a lower rate of shivering.[13] The used of Dexmedetomidine as intravenous infusion reduced the vasoconstriction threshold window and the threshold window for shivering . Dexmedetomidine did not changed the sweating threshold of the subjects studied and it decreased the concentration response curves for vasoconstriction and shivering in a linear fashion. Hence , the used of

Dexmedetomidine has shown to have an inhibition in the thermoregulatory responses within a wider range of temperatures[13]

The used of Dexmedetomidine in combination with isoflurane or halothane, Dexmedetomidine can decreased the cerebral blood flow in dogs upto 30% to 45% without the evidence of cerebral ischemia [3,13]. There was no adverse effects on cerebral metabolic rate and intracranial pressures. Alpha-2-adrenoceptor agonists has shown to be neuroprotective in an animal model of brain ischemia.

In humans who received, high-dose Dexmedetomidine (goal: plasma level, 1.1 ng/mL).,cerebral blood flow was decreased up to 25%[13]

POST OPERATIVE EFFECTS

Pain often results from recovering of anaesthesia along with elevated catecholamine concentrations. The residual effects of anaesthesia also compromise breathing. Therefore, α_2-adrenoceptor agonists can proved beneficial in the post-operative period due to their extended action on sympathetic system and analgesic effects without the respiratory depression. All effects of Dexmedetomidine can be antagonized by administering the Alpha -2 adrenoceptor antagonist

atipamezole , which like Dexmedetomidine can reverse the sedation and sympatholysis and has a half-life of 1.5 to 2 hours . The combination of dexmedetomidine and atipamezole may be in the future be used as the basis for a reversible intravenous anesthetic technique that could provide recover independently from anesthesia and sedation. The use of Dexmedetomidine can be returned to the baseline level of consciousness if the patients are being stimulated. This property of Dexmedetomidine was shown by Hall et al [12], who uses the Bispectral Index System , and the psychometric tests such as the Visual Analog Scale(VAS) for sedation, Digit Symbol Substitution Scale, observer's Assessment of Alertness/Sedation scale, and specific memory tests[12]. When atipamezole was used, it reversed the hemodynamic values returned to baseline after 4 hours of treatment. A more objective sign was the returned of the Bispectral Index System(BIS), where it uses a processe as electro-encephalogram signal analysis, when encouraged from 60 to 65 the stimulus was back to normal baseline values.

Dexmedetomidine can provides intense analgesia during the postoperative period (upto 24 hours)[11].

Postoperative rescue analgesic requirements was decreased upto 50% in patients undergoing cardiac surgeries, and the need for injection midazolam for sedation was diminished upto 80% but due to the lack of amnestic properties of Dexmedetomidine a few number of patients found the experience to be very stressful and they were able to recall their ICU stay[11].

Dexmedetomidine may have minute respiratory adverse effects[11]. Indeed, the receptor binding studies that suggest its effects on respiration should be minimal. The obstructive respiration pattern and irregular breathing seen with such patients was related to the used of more sedation and some anatomical features of the patients. The danger of respiratory depression with sedative agents is also an alarming feature, so the need to discontinue the use of sedatives during extubation period, but the used of Dexmedetomidine as infusion can be continued safely[11] even after extubation and the patient can breathe spontaneously. But if the patient had received opiods , then the result cannot hold true. Hence a study need to be done to confirm on this point.

In human volunteers, Dexmedetomidine has shown a depression and also a rightward shift of the carbon dioxide (CO2) response curve in human volunteers [14]. In a report about respiratory effects, the respiratory rates and arterial blood gas (ABG) values of post-surgical patients were reported. This study showed no differences in the respiratory parameters[14]. Respiratory rates were lower in treated patients and the respiratory effort was more consistent along with preserved minute ventilations, which produced better oxygenation [14].

Many agents and drugs that was used in the ICU set up have been shown that they modify the immune response system. Midazolam, a frequently used sedative agent, can reduced the phagocytic effects and decrease the interleukin-8 (IL-8) release response to lipopolysaccharide, an effect not seen with opioids[15]. Moreover, Dexmedetomidine at clinically relevant doses, the concentrations did not influence the chemotaxis or phagocytosis or O_2^- free - radical production by neutrophils.[15]. Also, Alpha-2-adrenoceptor agonists failed to scavenge the O_2^- free radicals that can be generated by the cell-free system [15] . Overall, there seems to be minimal evidence of any clinically relevance that the immunomodulation done by Dexmedetomidine [15].

The postoperative hemodynamic effects of Dexmedetomidine were stable as compared to its intraoperative effects. These postoperative changes in Mean arterial pressureand heart rate may be important factors in the outcome of high-risk patients, such as those who have to undergo vascular surgeries or coronary artery by-pass graft surgery [15].

MATERIAL AND METHODS

The study was a prospective, randomised, double blinded, placebo controlled comparative study. 60 patients of ASA physical grading of I and II were taken for the study. The age limit of 18 to 65 years, of either sex and posted for laparoscopic surgeries.

Anaesthesia was given using general anaesthesia only were included in the study.

The study was conducted in Chengalpattu Medical College Hospital over a period of one year. Institutional ethics committee approval was obtained.

Permission from the collaborated department was also obtained.

The procedure was explained to the patient and informed consent was obtained.

Detailed history of the patients were collected, and routine investigations like complete blood count(CBC), blood glucose, renal function tests (RFT), serum electrolytes (sodium , potassium, chloride), chest x ray(CXR), electrocardiogram (ECG) were done as per our institution protocol.

Patients fulfilling the inclusion criteria with consent were then randomly allotted to one of the study groups.

The patients were selected using computer generated randomized list.

Inclusion criteria

- ASA PS 1 and 2
- Age 18 to 65 years of either sex.
- Patients posted for laparascopic surgeries.

Exclusion criteria

- ASA PS 3 and 4 .
- Patients with decreased autonomic control such as the elderly, diabetic patients.
- Patients with uncontrolled hypertension.

- Patients with valvular heart disease, on drugs like β blockers or calcium channel blockers.
- Pregnant or lactating women.
- Duration of surgery after creation of pneumoperitoneum >60 minutes.

Materials Needed

- Infusion syringe pump with 20 cc Syringe.
- Injection Dexmedetomidine 50 mcg /0.5 ml.
- Boyle's Apparatus for providing General anaesthesia.
- Working Laryngoscope, cuffed endotracheal tubes of appropriate size, airway, suction apparatus with a suction catheter.
- Emergency drugs such as Inj. Adrenaline, Inj. Atropine, Inj. Ephedrine
- Monitor for continuous monitoring of non - invasive blood pressure (NIBP), Electroencephalography (ECG), Pulse Rate (PR), Respiratory Rate(RR) ,Oxygen saturation (Sp02).

METHODOLOGY

A wide bore 18 G intravenous cannula was inserted for giving the intravenous fluids, and another line of the same size on other limb was taken up for the infusion pump.

The patients were randomly allocated by envelope method into three groups of 20 patients each.

- Group J = patients receiving Dexmedetomidine infusion 0.4 mcg/kg/hr)
- Group K = patients receiving Dexmedetomidine infusion 0.2 mcg/kg/hr)
- Group L = patients receiving normal saline 0.9% infusion).

Infusion was prepared according to the group by 3rd person colleague present in the operation theatre.

To prepare the infusion, Dexmedetomidine (50 mcg/ 0.5 ml) was withdrawn in a 20 ml syringe and was then diluted to 12.5 ml with normal saline that results in the final concentration of 4 mcg/ml.

The infusion was given through SAMTRONIC® INFUSION 101-P, syringe infusion pump (15 minutes before starting of surgery). Depending on the weight of the patient the infusion pump was set to the target rate throughout the surgery. After setting the infusion , the pump was covered with green towel by third person, so that the assessor do not know the grouping of the patient. Thus volume of prepared solution was same, only the rate of infusion was different. Thus, the patient and the assessor were unaware of the group. Decoding of blinding to the assessor was done only at the time of tabulation and result analysis.

- **Premedication:** After starting an IV line, Inj. Glycopyrolate 0.2 mg iv and Inj Fentanyl 2 mcg / kg iv were administered. Inj. Dexmedetomidine was started as an infusion through infusion pump 15 min before induction of anaesthesia.

- **Pre-oxygenation:** Pre-oxygenation with 100 % 02 was given for 3 min.

- **Induction :** Inj. Propofol 2 mg/kg intravenously was given which was then followed by Inj. Succinyl choline of 2mg/kg intravenously.

- **Intubated :** Trachea was intubated with appropriate size cuffed endotracheal tube.The patients were mechanically ventilated using circle system to keep the $EtCO_2$ between 35 and 45 mm Hg.

- **Relaxant:** Inj. Atracurium 0.5mg/kg iv.

- **Maintenance :** Anaesthesia was maintained with O_2:N_2O (50:50), isoflurane (0.5% – 1%) and inj. Atracurium (0.1 mg /kg iv).

- **Parameters Monitored** :Multipara monitor was attached, the baseline readings such as Pulse Rate (PR), Mean Arterial Pressure (MAP) were recorded.

Vital parameters like PR, MAP were noted during the following ;

- Before starting the infusion.
- 15 min after starting the infusion
- 1 minute after intubation
- 1 minute after creation and release of pneumoperitoneum
- Intra operative period (every 15 minutes)
- 1minute after extubation.

❖ Isoflurane and drug infusion was discontinued after release of pneumoperitoneum.

- **Reversal** : Inj. Neostigmine 0.05 mg/kg + injection Glycopyrolate 0.2 for every 1mg of inj. Neostigmine used.

- **Extubation :** Patients were extubated after proper oral suctioning.

- **Post-operative :**

✓ The time to first rescue analgesic requirement was taken as the time from completion of infusion to the time when pain was ≥ 3 on visual analogue scale [VAS] .

✓ Injection diclofenac sodium 1.5 mg/kg IM was used as rescue analgesic .

✓ Total amount of rescue analgesia drug required during the first 24 hours post-operatively was noted for each patient.

✓ Sedation was assessed using Ramsay sedation score (RSS) at 1, 15, 30, 60 to 120 min post-operatively.

- ✓ Throughout the surgery, patients were observed for any adverse effects like bradycardia, tachycardia (Pulse rate of less than or more than 20 percent of pre-operative level respectively on two consecutive readings).
- ✓ Hypo and hypertension (MAP less than or more than 20 percent of pre-operative level respectively on two consecutive readings).

Sample size: Sample size was calculated using MedCalc Software version 11.5.0.0.). Based on minimum mean difference of 24% in parameters with alpha =0.01 and beta =0.20, sample size for each group was estimated at 19.

Rounding up this figure, I took 20 patients in each group. The results were tabulated and statistically analysed using the Statistical Package for Social Sciences (SPSS) v16.0

The chi - square test was used for qualitative data (sex, ASA grade), PR, blood pressure, were compared within the group against baseline values using paired t-test. ANOVA test was used for the three groups in comparisons for the continuous variables; if ANOVA was found significant, SPSS v16.0 was used for comparing two groups . The

results were expressed as mean ± standard deviation. If P value was >0.05 was considered insignificant, or if p value - <0.05 as significant and highly significant if p value was <0.001

RAMSEY SEDATION SCORE

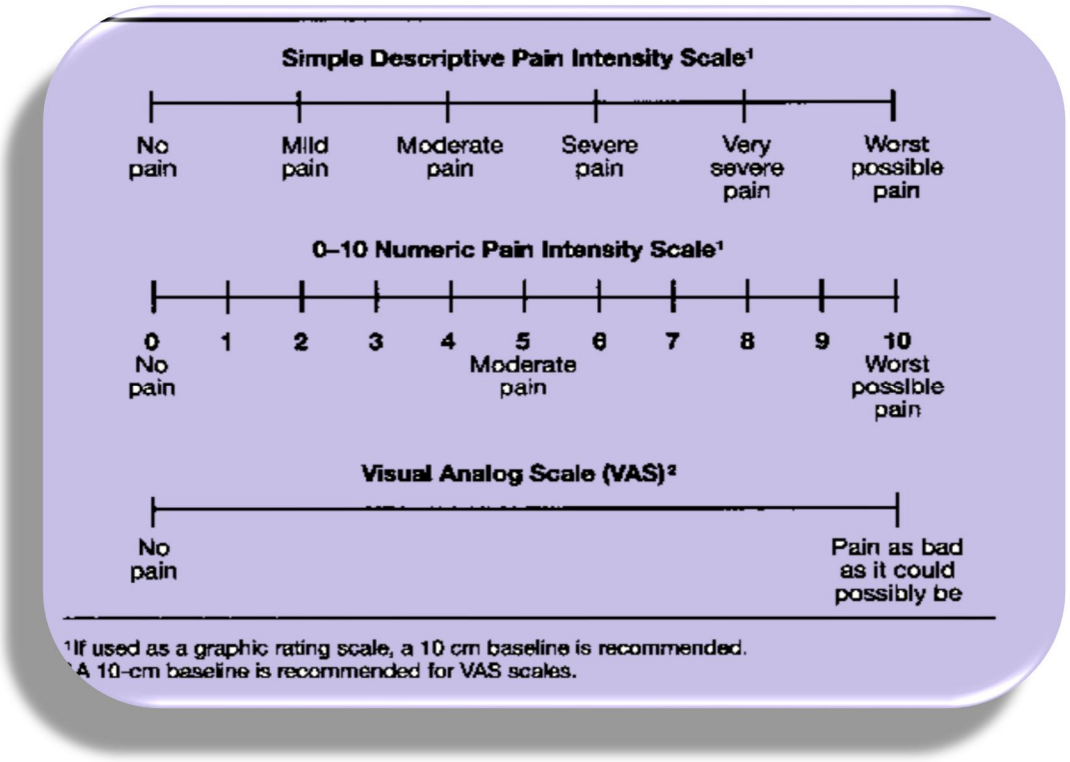
If Awake:

- 1 Restless ,anxious, agitated
- 2 Cooperative, oriented, tranquil
- 3 Response to commands only

If Asleep:

- 4 Brisk response to light glabellar tap or loud auditory stimulus
- 5 Sluggish response to light glabellar tap or loud auditory stimulus
- 6 No response to light glabellar tap or loud auditory stimulus

VISUAL ANALOGUE SCALE



REVIEW OF LITERATURE

Aantaa R, Kanto J, Scheinin M, Kallio A, Scheinin H et al (2006)[15]: Studied the effects of intraoperative infusion of Dexmedetomidine on perioperative analgesic requirements in 50 patients.The patients were divided into two groups, one group received Dexmedetomidine infusion and another group received saline infusion. They found that requirement of morphine in the post operative period was significantly lower in Dexmedetomidine group.They concluded that intra operative use of Dexmedetomidine provides effective post operative analgesia and reduces analgesic requirement in the post operative period without increasing side effects.

Chirag Ramanlal Patel, Smita R Engineer, Bharat J Shah, and S Madhu et al (2012)[16]: In their study, they showed that Dexmedetomidine attenuates various stress responses during surgery and maintains the haemodynamic stability when it was used along with general anaesthesia. Also, the sedative action of Dexmedetomidine (1mic/kg/hr) , but at this dose it delays the recovery during the post extubation period.

Suvadeep Sen, Jayanta Chakraborty, Sankari Santra, Prosenjit Mukherjee, and Bibhukalyani Das et al(2009)[17] : Studied the effects of Dexmedetomidine on heamodynamic parameters and dose of propofol during anesthetic induction in 80 patients. Patients were divided into two groups , one group received Dexmedetomidine and another group received saline. They found that mean arterial pressure and heart rate were significantly lower in Dexmedetomidine group , the dose of propofol was also lower in Dexmedetomidine group. They concluded the use of Dexmedetomidine before induction blunted the heamodynamic stress response associated with laryngoscopy and intubation, it also reduced the requirement of propofol.

Aho MS, Erkola OA, Scheinin H, Lehtinen AM, Korttila KT et al (1991)[18]: The authors concluded that after laparoscopic tubal ligation, administered of Dexmedetomidine intravenously(iv) relieves pain and reduces the opioid drug requirement but it accompany by sedation along with incidence of bradycardia.

Salman N, Uzun S, Coskun F, Salman MA, Salman AE, Aypar U et al (2009)[19] : This study demonstrated that Dexmedetomidine infusion caused a slow recovery with the reduced postoperative nausea, vomiting (PONV), and analgesic requirements, and similar hemodynamics compared to remifentanil during laparoscopic surgeries. It can be used as an alternative to remifentanil in ambulatory laparascopic anesthesia.

Chirag Ramanlal Patel, Smita R Engineer, Bharat J Shah, and S Madhu et al: (2013)[20] : In their study, they concluded that the highly selective alpha- 2 adrenoceptor agonist, Dexmedetomidine, as an adjuvant in general anaesthesia, decreases the need for sevoflurane used in maintaining adequate depth of anaesthesia.

S S Harsoor, S S Nethra, S Lathashree, Devika D Rani and K Sudheesh et al (2014) [21] : In their study they have concluded that the used of Dexmedetomidine infusion was effective in blunting the stress response to surgical trauma as indicated by a decreased in blood sugar

levels, and reduces the need for Sevoflurane requirements during entropy guided general anaesthesia ? without affecting time for extubation.

Bhattacharjee, Sushil Kumar Nayek, Satrajit Dawn, Gargi Bandopadhyay, Krishna Gupta et al (2004)[22] : Concluded that Dexmedetomidine improves intra and post-operative haemodynamic stability during laparoscopic surgery without prolongation of recovery.

Waleed M. Abdelmageed, Kaled M. Elquesny, Ramadn I. Shabana Ahmad M. Nassar et al (2011)[23] : In this study done in 2015 Waleed and company concludes that continuous Dexmedetomidine infusion was a useful analgesic property for patients who are susceptible to opioid-induced respiratory depression.

Varshali M Keniya, Sushma Ladi, and Ramesh Naphade et al (2011)[24] : In their study they have concluded that Dexmedetomidine, when used as a pre-anaesthetic medication along with intra-operative infusion, it will decreases the intra-operative anaesthetic requirement. It has significant opioid sparing anaesthetic property. Its uses has

significantly attenuated the sympatho-adrenal response to the tracheal intubation. Moreover, continuous intra-operative administration of Dexmedetomidine does not affect the intra-operative cardiovascular stability.

Islam. Al-Mustafa, Mohsen, Asma S. Basha, Khaled R. M. Massad, Wafa A Al-Zaben, Mahmoud M. Subhi M. Alghanem et al (2009) [25] : Concluded that, the use of Dexmedetomidine as part of a balanced anaesthesia technique reduces the incidence of post-laparascopic surgery nausea and vomiting , either directly, or by decreasing the overall their emetogenic effect.Controlled studies showing when comparing the uses of anti-emetic medications versus optimized balanced anaesthesia using different doses of Dexmedetomidine are needed.

Sanjana Vinod, Maya Rose Jose et al (2016)[26] : They had concluded that use of Dexmedetomidine in patients undergoing laparascopic procedures can produced a good haemodynamic stability . i.e stable mean BP and Pulse Rate after intubation .

Sukhminder Jit Singh Bajwa, Jasbir Kaur, Amarjit Singh, SS Parmar, Gurpreet Singh, Sachin Gupta, Veenita Sharma, Aparajita Panda et al (2012)[27] : They had concluded that Dexmedetomidine was an excellent drug when used as infusion .It decreased the magnitude of haemodynamic stress response to intubation, surgery and extubation, also decreased the dose of opioids requirement and isoflurane requirement in achieving the depth and adequate analgesia and anaesthesia .

Poonam S Kalpana D HarnagleShalini .K Thombre, Ghodki Shalini .P. Sardesai et al (2012)[28] : In their study they had approval and concluded Dexmedetomidine is an effective anesthetic drug that it can be used safely in laparoscopic surgeries without the fear of awareness under anesthesia.

OBSERVATION AND RESULTS

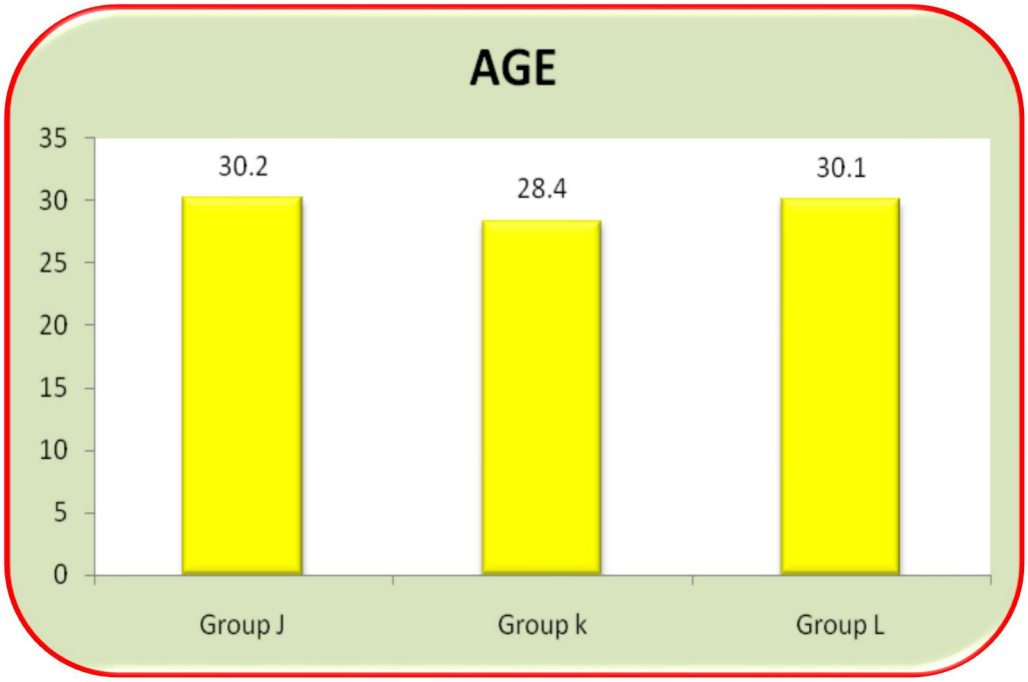
In my studies a total of 60 cases of laparoscopic surgeries were done and all cases were included and all of them were followed up.

A total of 20 cases in 3 divided groups ie.

- Group J (0.4 mic/kg/hr)
- Group K (0.2mic/kg/hr)
- Group L (NS) .

The results were analysed using an ANOVA test for three groups and comparisons of the continuous Variables ; if ANOVA was found significant, tuckey post-hoc test was used for comparing two groups and the results were expressed as mean ± standard deviation.

- If P value was >0.05 was considered insignificant and p value was <0.05 as significant and highly significant if p value was <0.001.

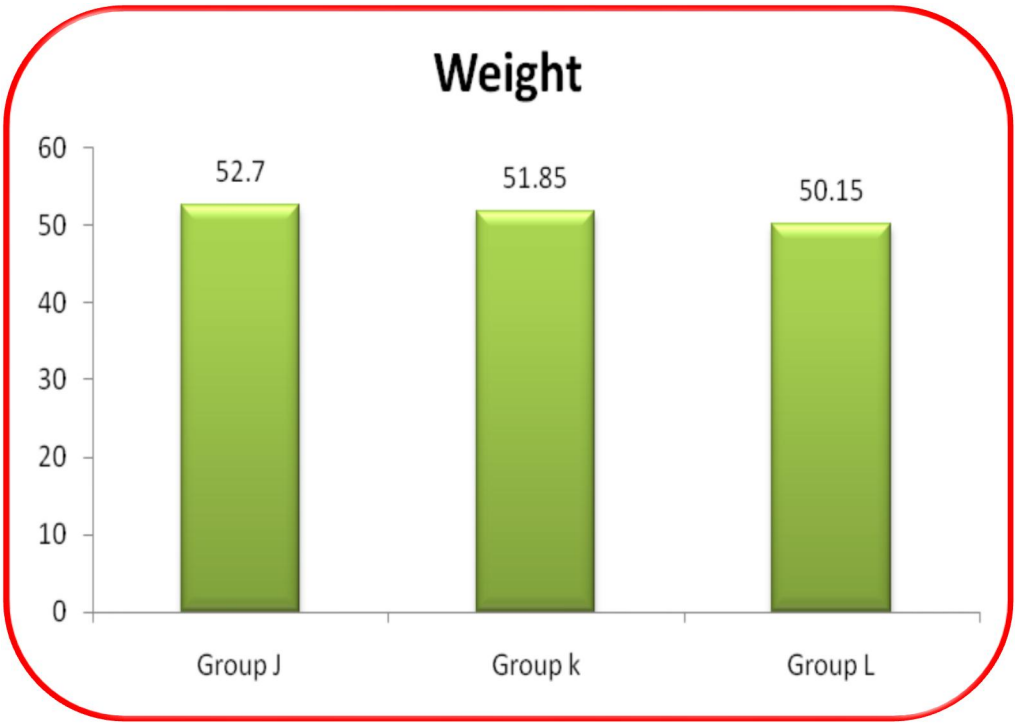


The Age group of the Three groups was taken and compared with a mean and Standard deviation as follows;

- Group J **30.2 ± 12.357** ,
- Group K **28.4 ±8.786**
- Group L **30.1 ± 6.664**

✓ The age in years statistically was not found to be significant where p value in all the groups was **p>0.05**

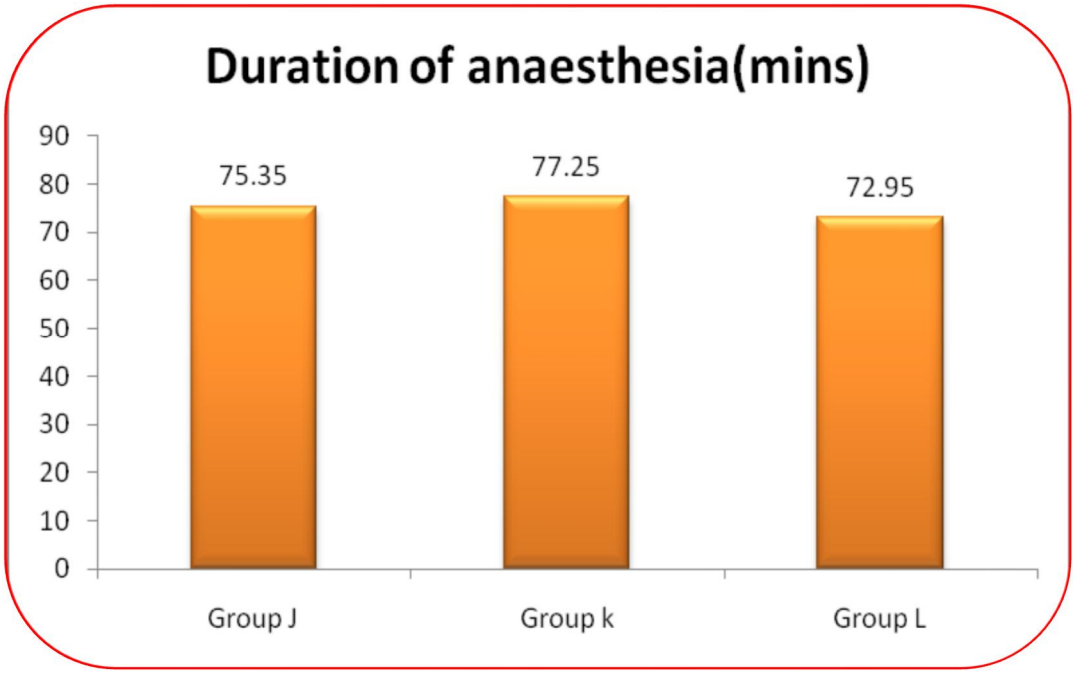
Weight in kgs



The weight in kgs of the Three groups were taken and compare with standard deviation.

- Group J **52.7±8.992**
- Group K **51.85±9.086**
- Group L **50.15±7.758** .
  - ✓ The weight in kgs, statistically was not found to be significant where p value in all the groups was **p>0.05**

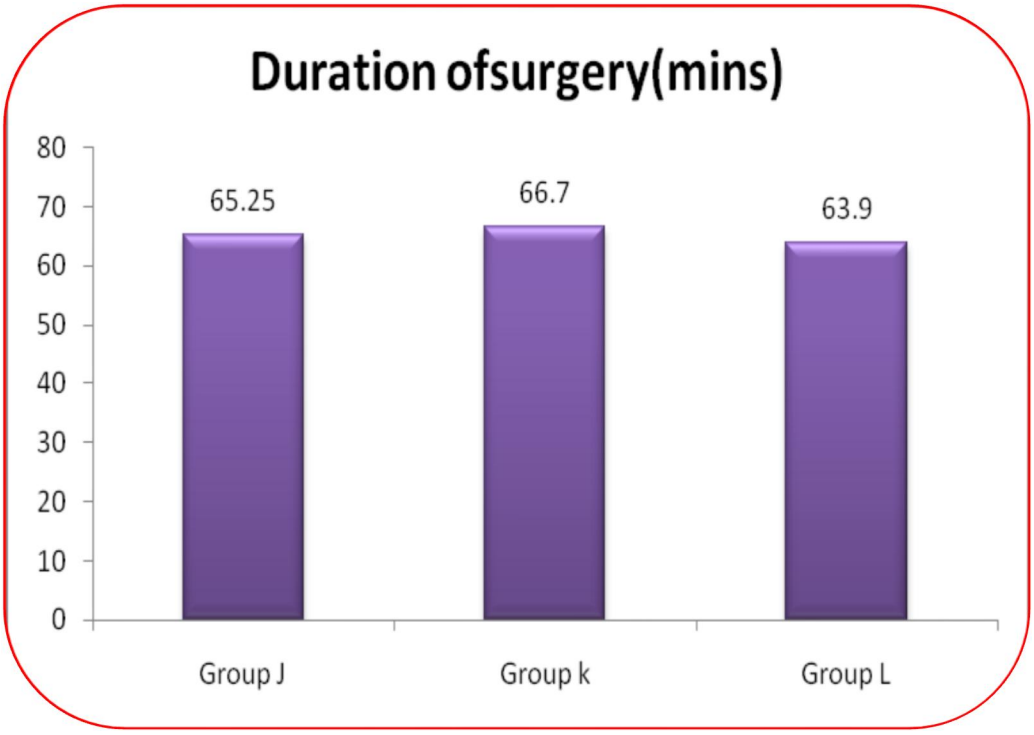
Duration of anaesthesia.(mins)



The duration of anaesthesia in mins were taken into Three groups and compare with standard deviation;

- Group J **75.35 ±9.19**,
- Group K **77.25 ±13. 475**
- Group L **72.95 ±15. 703.**
  - ✓ The duration of anaesthesia in mins ,statistically was not found to be significant where p value in all the groups was **p>0.05.**

Duration of surgery in mins

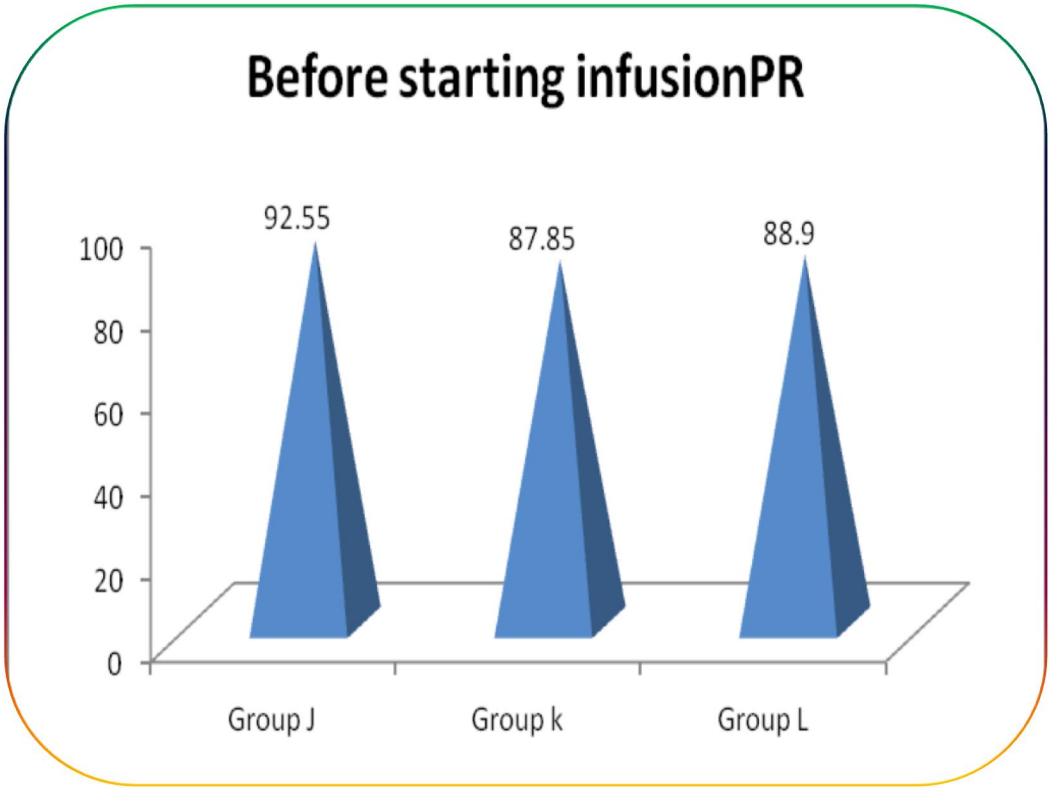


The duration of surgery in mins were taken into Three groups and Compare with standard deviation .

- Group J **65.25±8.861**
- Group K **66.7±13.095**
- Group L **63.9± 15.28**

✓ The duration of surgery in mins, statistically was not found to be significant where p value in all the groups was **p>0.05.**

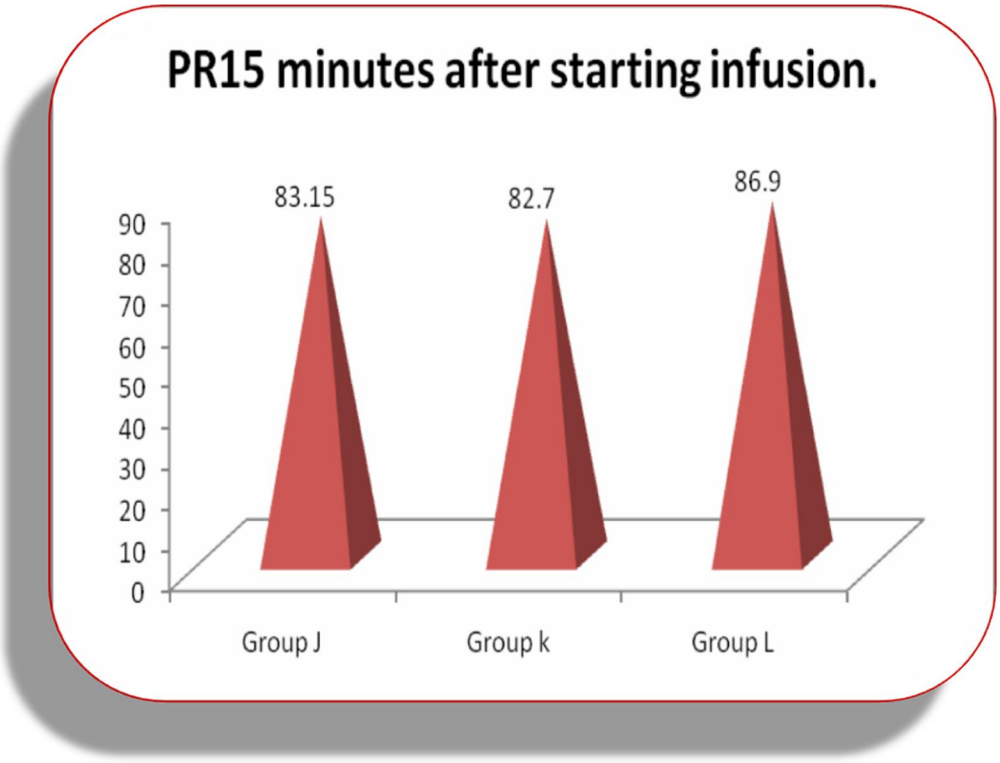
Furthermore pulse rate (PR) is measured before starting the infusion. 15 minutes after starting infusion. 1minute after induction,after laryngoscopy and intubation. After creation of pneumoperitoneum PR is measured at 1 , 15 , 30 , 45 , 60 mins respectively. After extubation 1 min.



The pulse rate before starting the infusion were taken into Three Groups and compare with standard deviation

- Group J **92.5±4.322**,
- Group K **87.85±8.543**
- Group L **88.9±7.405**

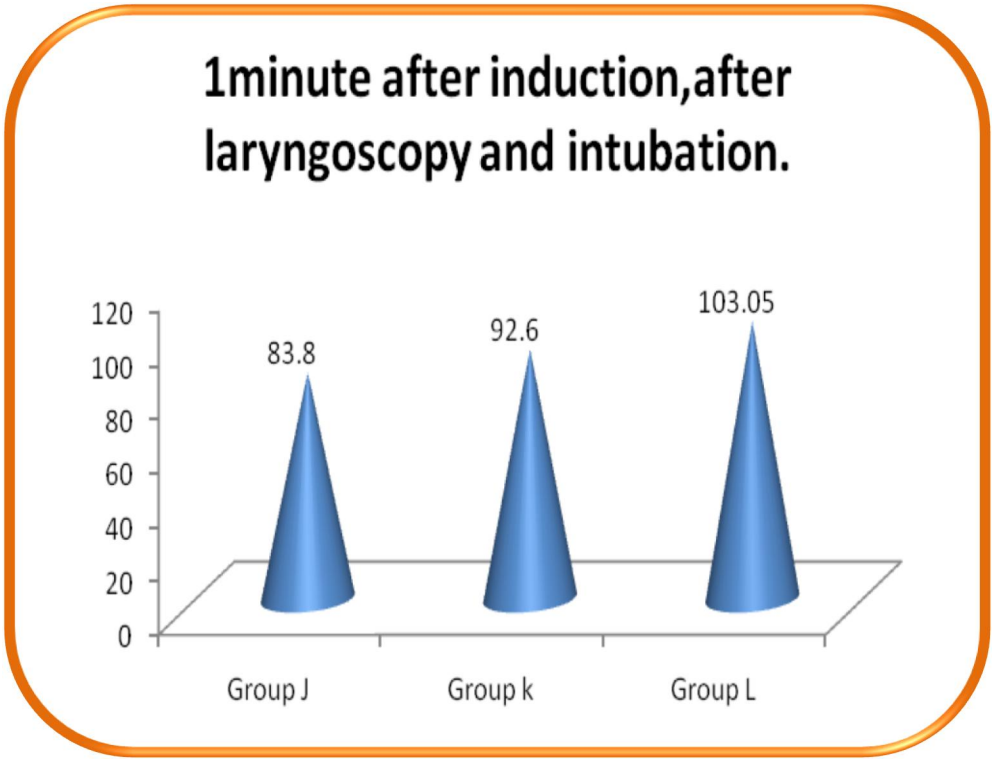
✓ The pulse rate before starting the infusion, statistically was not found to be significant where p =0.076 (p value >0.005)



The pulse rate 15 mins after starting infusion in mins were taken into Three groups and compare with standard deviation

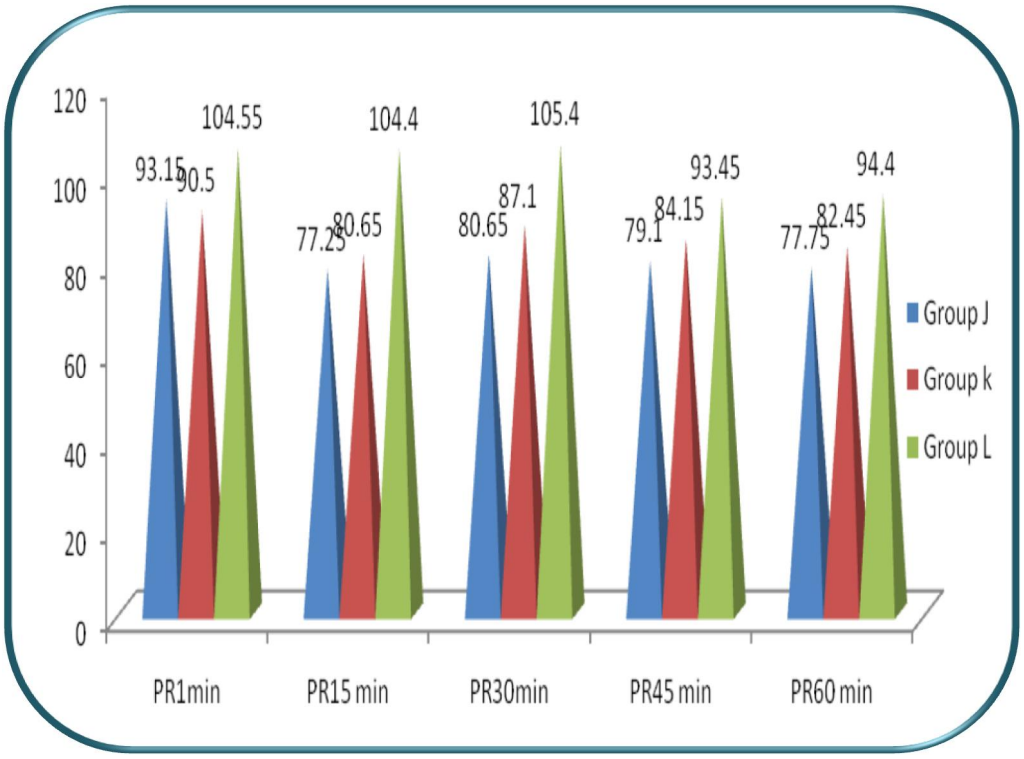
- Group J **83.15±2.498** ,
- Group K **82.7±1.129** ,
- Group L **86.9±3.076.**

✓ The pulse rate 15 mins after starting the infusion in mins, statistically was found to be significant in group J where p value was **p=0.0001** ($p<0.05$.)



The pulse rate 1 minute after induction , after laryngoscopy and intubation, mean and standard deviation in the following groups .

- Group J **83.8± 2.426**
- Group K **92.6±2.945**
- Group L **103.05±2.038**.
  - ✓ Group J **(p value = 0.0001)** was found to be significant. (p value < 0.005)



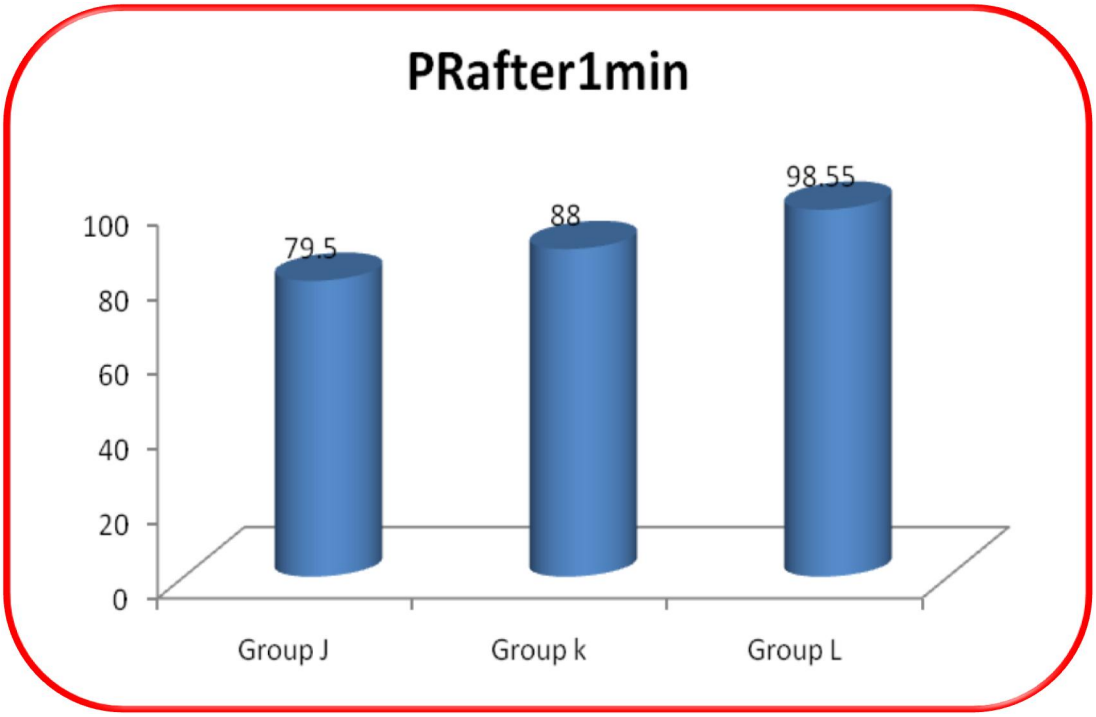
- The pulse rate after creation of pnumoperitoneum at 1min, 15 mins, 30 mins, 45 mins, 60 mins was taken. The mean and standard deviation in ;

- Group J at **1 min 93.15± 4.475** , 15 mins **77.25± 4.529** , 30 mins **80.65± 4.671** , 45 mins **79.1± 3.227** , 60 mins **77.75± 3.985**.

- Group K at 1 min **90.5± 20.575** , 15 mins **80.65± 7.013** , 30 mins **87.1± 5.619** , 45 mins **84.15± 2.346 ,** 60 mins **82.45± 3.471** .

- Group L 1min **104.55± 9.478** , 15 mins **104.4± 6.946** , 30 mins **105.4± 6.589** , 45 mins **93.45± 7.571** , 60 mins **94.4± 5.807**.

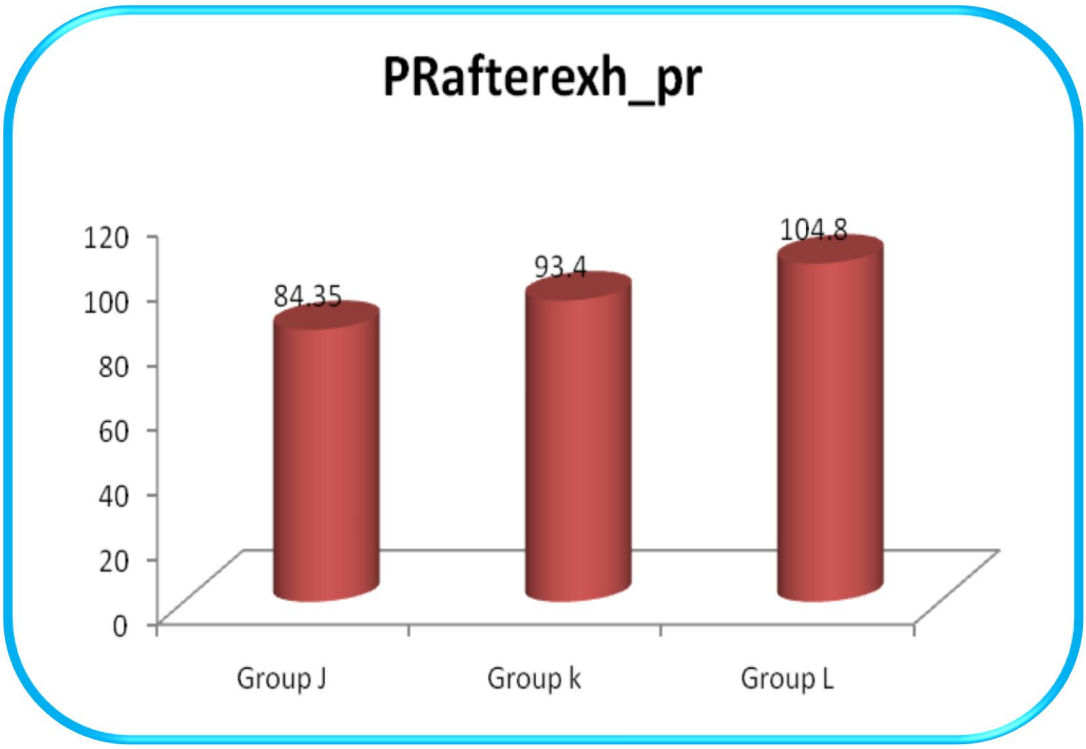
- ✓ In all the groups, **group J** p value at 1,15, 30 , 45, 60 mins respectively was found to be significant after computing and analysed **p=0.0001** (p value <0.005)



The pulse rate 1 minute after release of pneumoperitoneum with the mean and standard deviation ;

- Group J was**79.5±4.475**
- Group K **88±2.575**
- Group L **98.55±4.478**

✓ The result was analyse and compute and found to be significant in **group J p=0.0001** (p value <0.005)

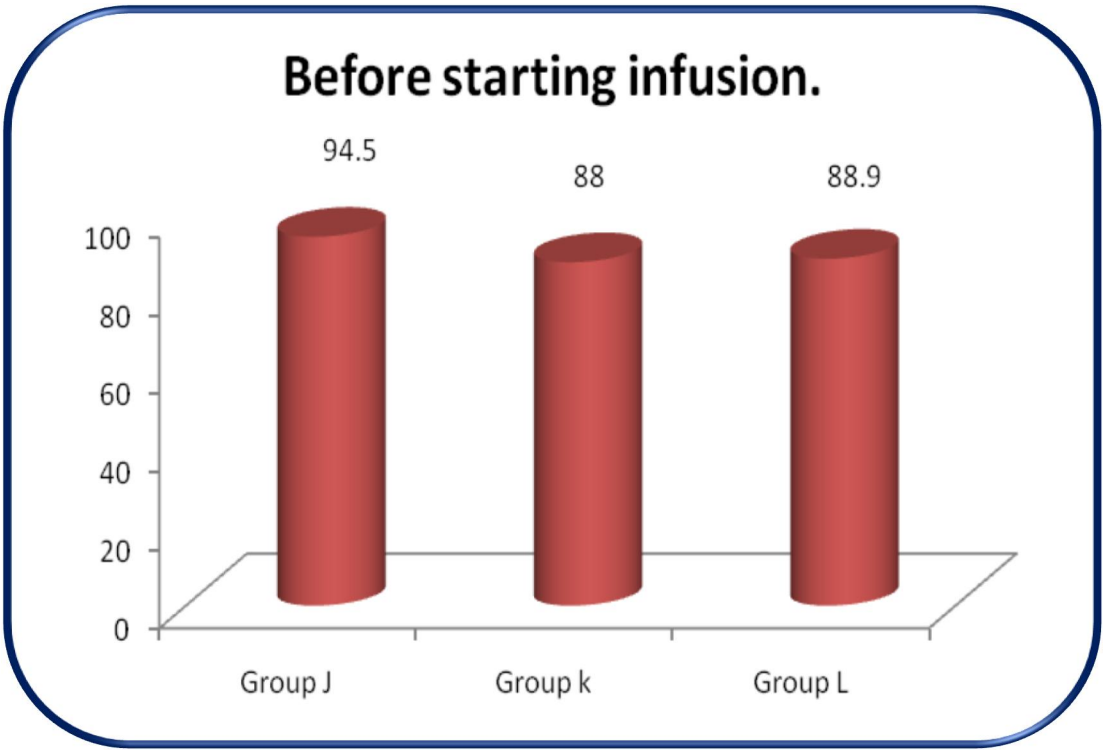


The pulse rate after extubation was taken with the mean and standard deviation was computed in all the groups .

- Group J **84.35± 2.231**
- Group K **93.4± 5.093**
- Group L **104.8± 6.246**.

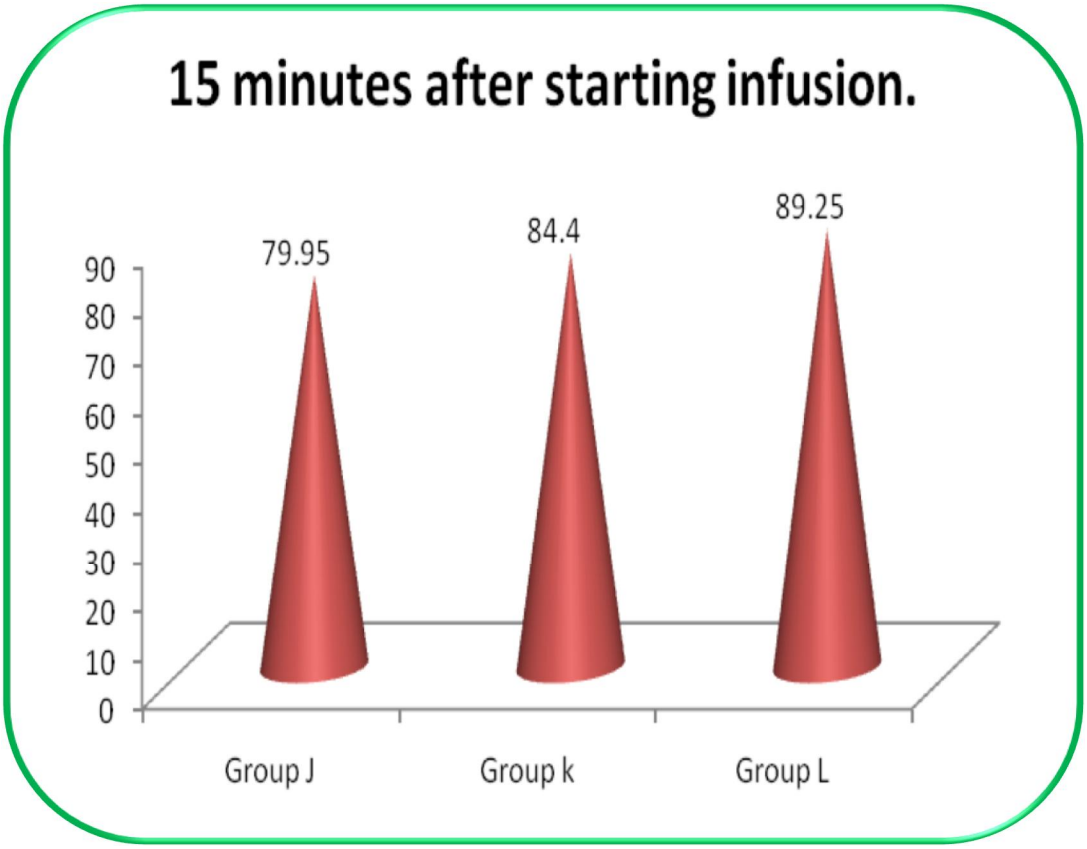
✓ The p value was analysed and found to be significant in **group J p=0.0001** (p value <0.005)

MAP (mean arterial pressure) .



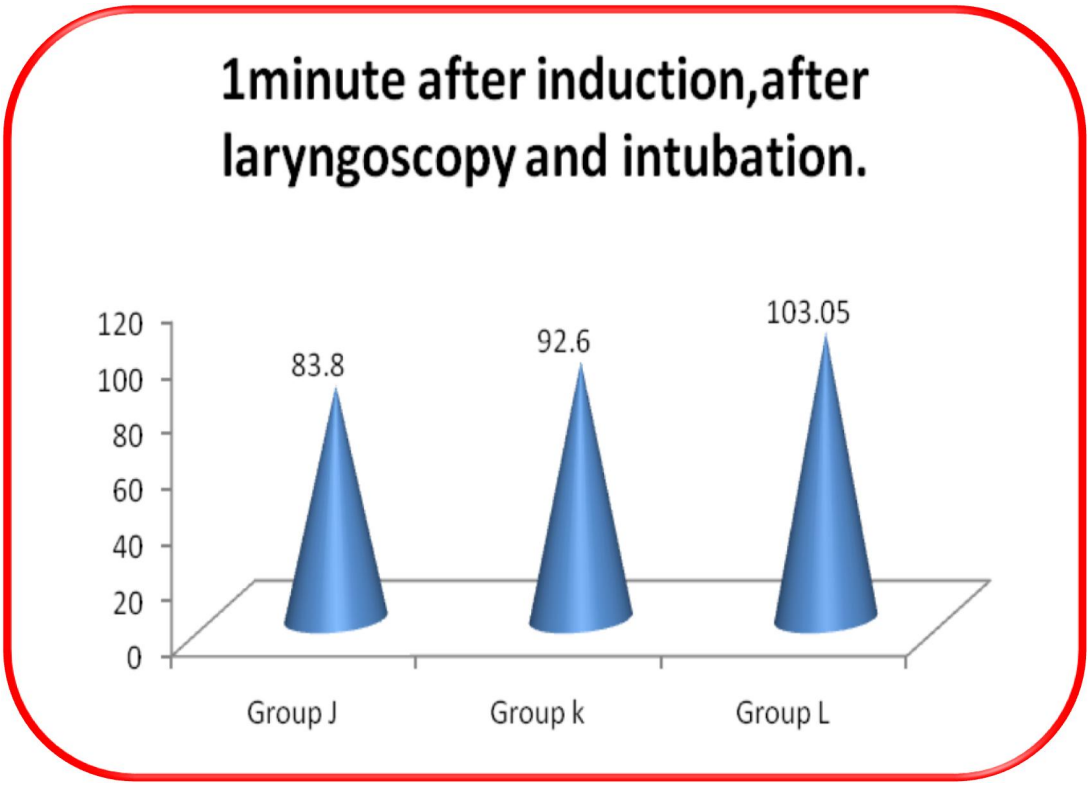
The MAP was taken before starting the infusion in all the groups and result of the mean with standard deviation was as follows .

- Group J **94.5± 5.073**
- Group k **88± 8.7**
- Group L **88.9± 7.405**.
  - ✓ After computing and analyse the p value was foung **not to be significant in all the groups P value in all groups (P value >0.005)**



MAP was taken 15 minutes after starting infusion and measure mean with standard deviation in all the groups.

- Group J **79.95± 5.772**
- Group K **84.4±7.323**
- Group L **89.25± 7.239**.
  - ✓ The result was analysed and found to be significant in **group J** with **p value = 0.0001** (p value <0.005)

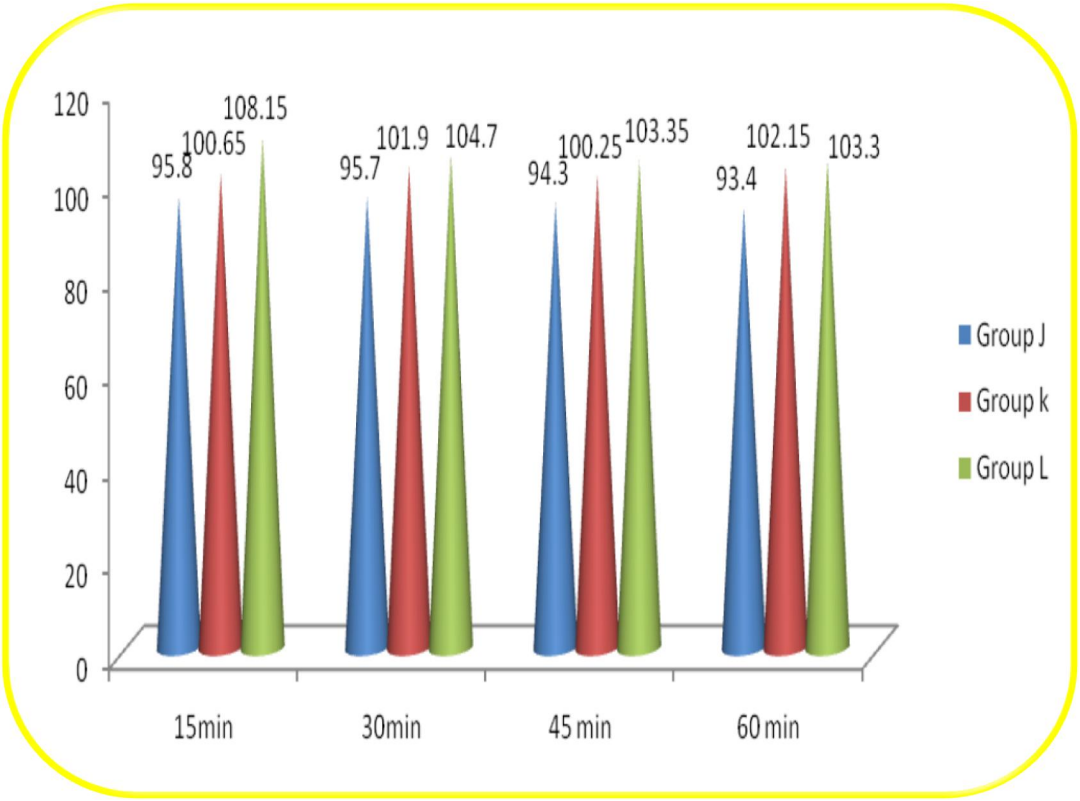


MAP was taken 1minute after induction, after laryngoscopy and intubation and measure mean with standard deviation in all the groups.

- Group J **83.8± 5.327**
- Group K **92.6± 8.375**
- Group L **103.05± 3.634.**

  - ✓ The result was analysed and found to be significant in **Group J** with **p value = 0.0001** (p value <0.005)

The MAP after creation of pnumoperitoneum at 15 mins, 30 mins, 45 mins, 60 mins

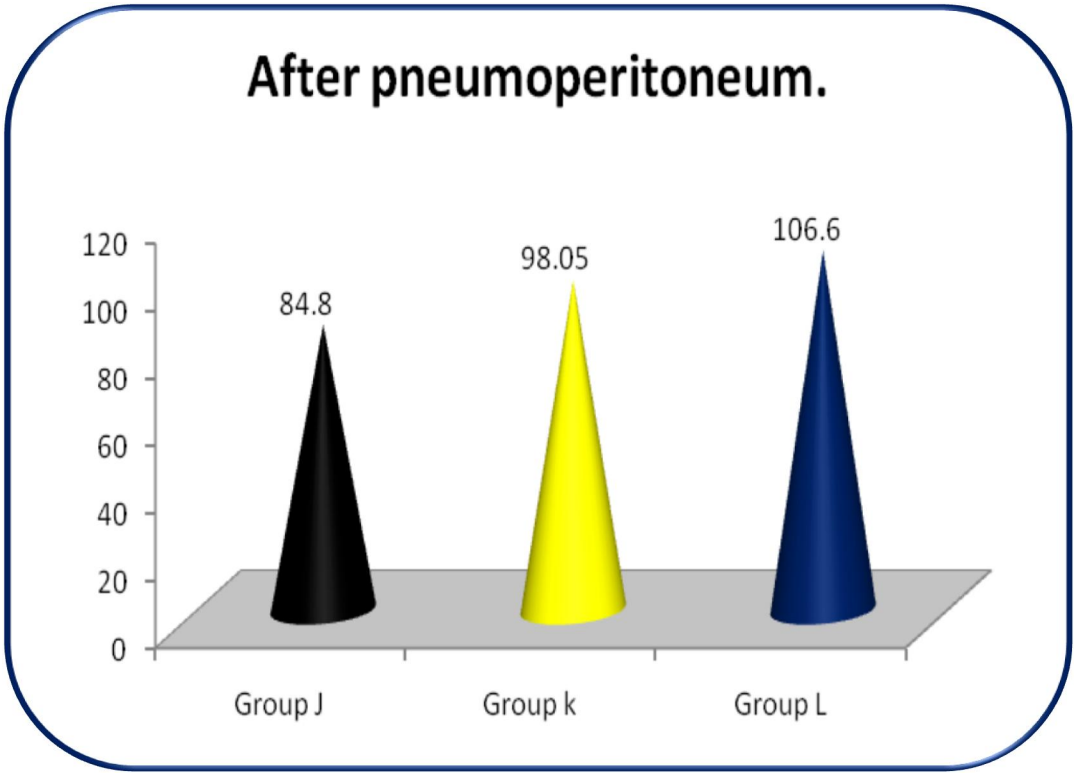


The MAP after creation of pnumoperitoneum at, 15 mins, 30 mins, 45 mins, 60 mins was taken .The mean and standard deviation in various groups are ;

- Group J at 15 min **95.8± 2.648** , 30 mins **95.7± 3.011**, 45 mins **94.3± 2.13** , 60 mins **93.4± 2.257**.
- Group K at 1 min **100.65± 4.815** , 30 mins **101.9± 3.307** , 45 mins **100.25± 2.531 ,** 60 mins **102.15± 2.56** .

- Group L, 15 mins **108.15± 2.943** , 30 mins **104.7± 3.197** , 45 mins **103.35± 2.54** , 60 mins **103.3± 1.031**

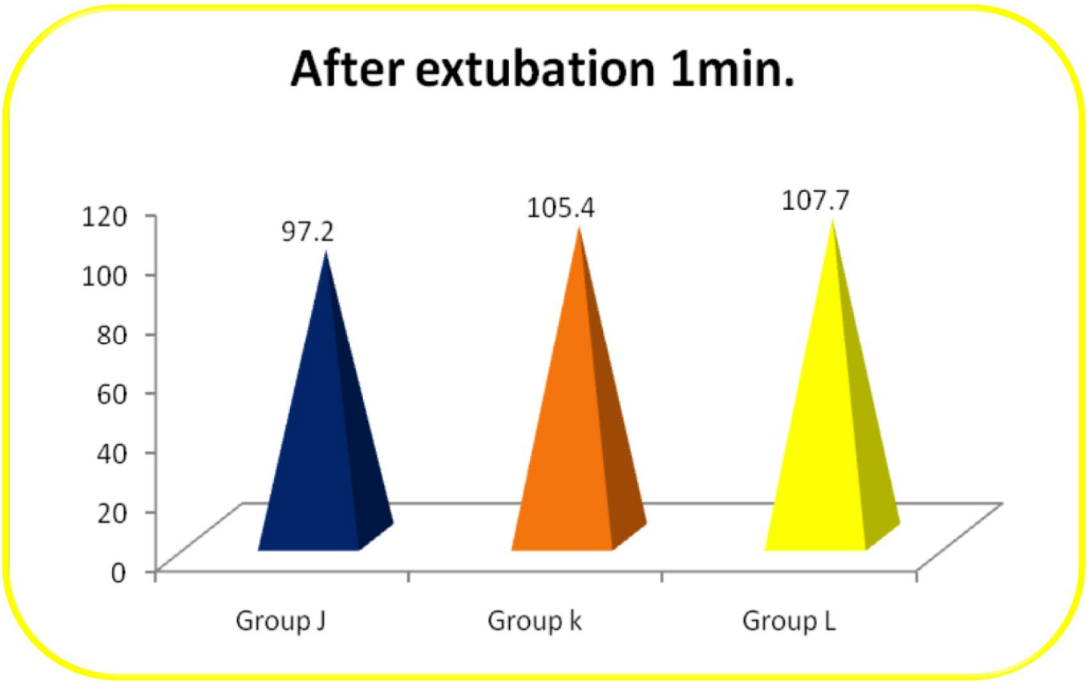
  - ✓ In all the groups, Group J with p value at 1,15, 30 , 45, 60 mins respectively was found to be significant after computing and analysed **p=0.0001** (p value <0.005)



MAP is evaluted after release of pneumoperitoneum for all the three groups and results was computed along with standard deviation as follows,

- Group J **84.8±4.007**
- Group K **98.05±4.136**
- Group L **106.6±2.353**

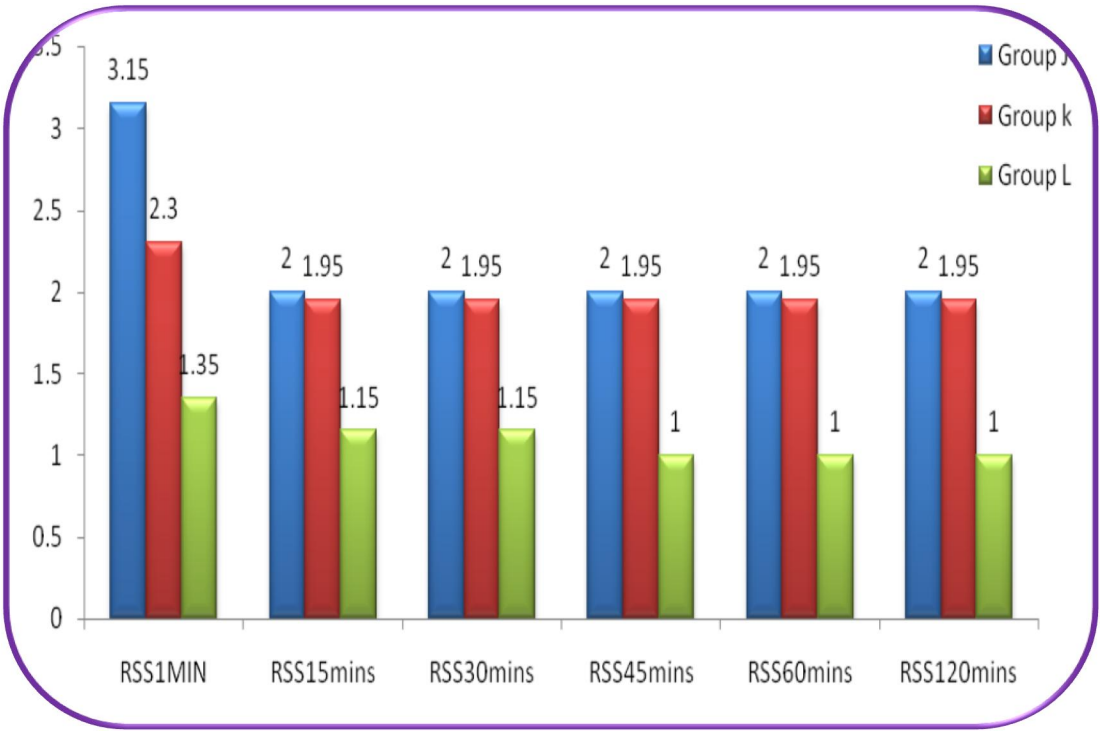
  - ✓ The results were analyse and p value was found to be significant in **group J. p=0.001 (** pvalue < 0.005)



The MAP after extubation was taken, the mean and standard deviation were computed in all the groups.

- Group J **97.2± 2.802**
- Group K **105.4± 3.979**
- Group L **107.7± 2.055**
  - ✓ The p value was analysed and found to be significant in **Group J p=0.0001** (p value <0.005)

RSS



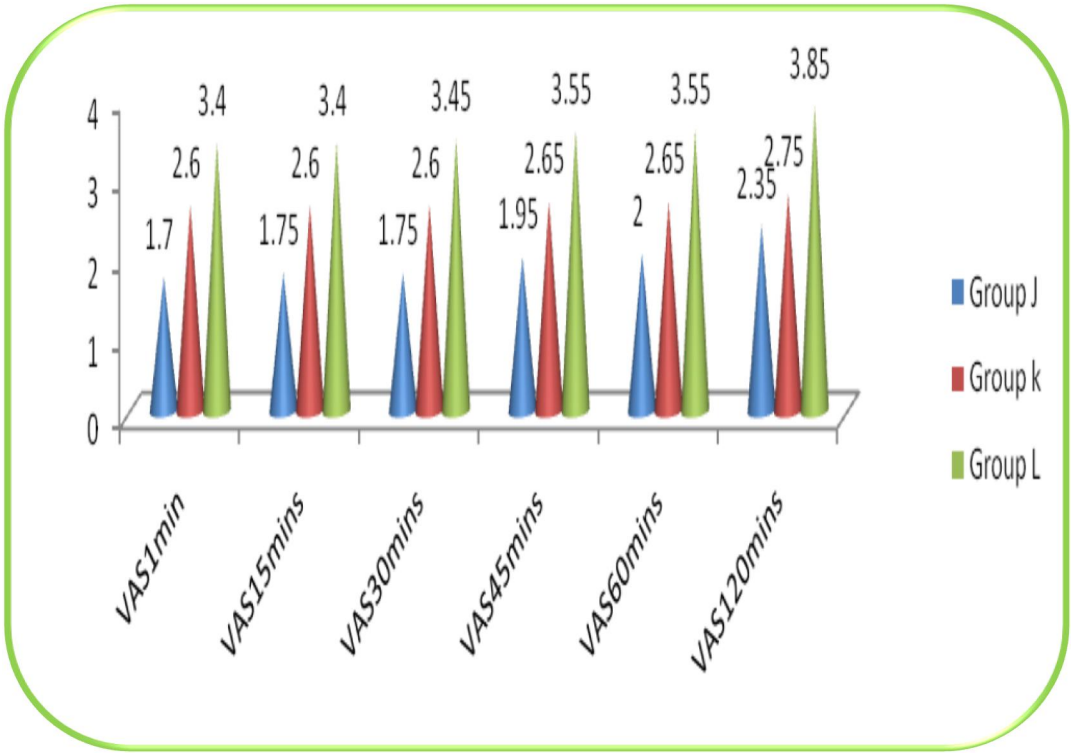
The RSS (ramsey sedation score) was taken and compute at 1min, 15 mins, 30 mins, 45 mins, 60 mins. The mean and standard deviation in groups are as follows;

- Group J at **1 min 3.15± 0.366**, 15 mins **2±0**, 30 mins **2±0**, 45 mins **2±0** , 60 mins **2±0**, 120 mins **2±0**
- Group K at 1 min **2.3± 0.47**, 15 mins **1.95± 0.224** , 30 mins **1.95±0.224** , 45 mins **1.95± 0.224,** 60 mins **1.95± 0.224**.120 mins **1.95± 0.224**

- Group L 1min **1.35±0.489**, 15 mins **1.15±0.366**, 30 mins **1.15±0.366**, 45 mins **1±0** , 60 mins **1±0**, 120 mins **1±0**

  - ✓ In all the groups, **group J** with p value at 1,15, 30 , 45, 60 and 120 mins respectively was found to be significant after computing and analysed **p=0.0001** (p value <0.005)

VAS

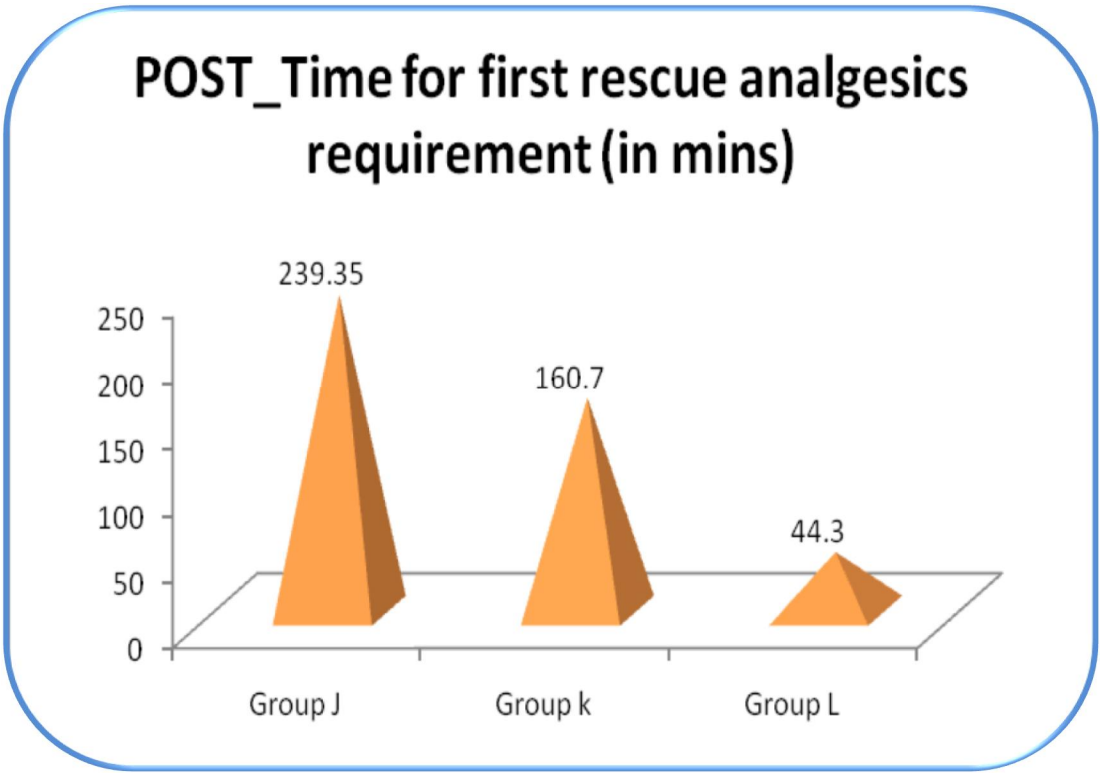


The VAS (visual analogue score) was taken and compute at 1min, 15 mins, 30 mins , 45 mins , 60 mins,120 minutes after extubation. The mean and standard deviation in the following.;

- Group J at **1 min 1.7± 0.657** , 15 mins **1.75± 0.639** , 30 mins **1.75± 0.639**, 45 mins **1.95±0.51** , 60 mins**2±0.459**, 120 mins **2.35±0.671**
- Group K at 1 min **2.6±0.598** , 15 mins **2.6±0.598**, 30 mins **2.6±0.598**, 45 mins **2.65±0.671,** 60 mins **2.65±0.671,** 120 mins **2.75±0.716**

- Group L 1min **3.4±0.598** , 15 mins **3.4±0.598**, 30 mins **3.45±0.605**, 45 mins **3.55±0.605** , 60 mins **3.55±0.605**, 120 mins **3.85±0.366**

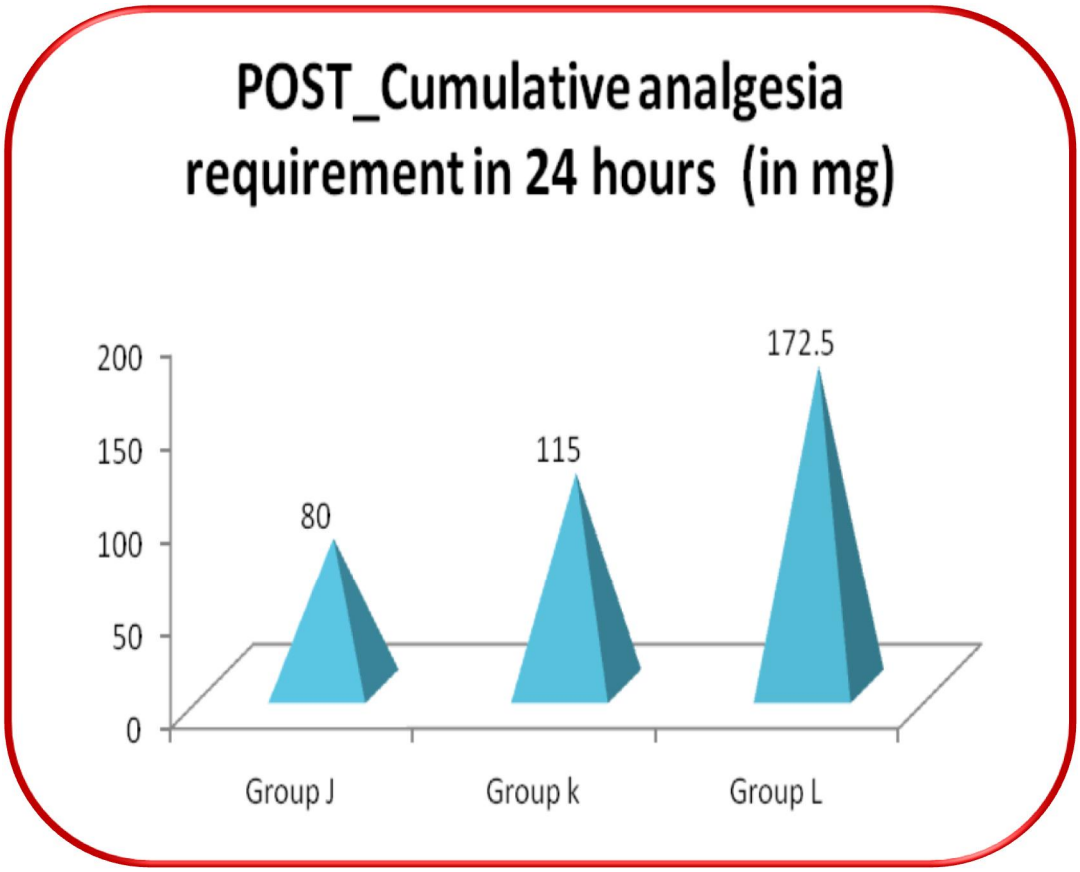
  - ✓ In all the groups, group J with p value at 1,15, 30 , 45, 60 and 120 mins respectively was found to be significant after computing and analysed **p=0.0001** (p value <0.005)



The post time for first time rescue analgesics requirement of patients :

- Group J with **239.35±16.375** (in mins)
- Group K **160.7±4.589** (in mins)
- Group L was **44.3±14.978**. (in mins)

  - ✓ The post time for first time rescue analgesic requirement is significantly low in Group J with **239.35±16.375** (in mins) **p value = 0.0001** ($p<0.005$).



The post reqirement of total rescue analgesics(in mg) that was needed in all the groups

- Group J was **80±10.26** , which is significantly low amount , with **p value = 0.0001**
- Group K **115±18.848**
- Group L **172.5±7.695.**

✓ The post reqirement of total rescue analgesics(in mg) that was needed was comparatively less in Group J **80±10.26** in mgs

RESULTS

- MAP and PR after starting Dexmedetomidine infusion 15 mins pre operatively, I found out that the result was significant , as the PR and MAP has reduced to optimised levels.

- MAP and PR were noted and found that the haemodynamic response to intubation in **group J** getting **0.4 mic/kg/hr** as infusion was significant and the MAP as well as PR was maintained at the optimised level as compared to other groups.

- Throughout the intra operative period the MAP and PR did not increase in **Group J (0.4 mic/kg/hr)** and the patient needs for volatile agents and analgesics was significantly decrease.

- After extubation the MAP and PR of patients in **groups J (0.4 mic/kg / hr** as infusion) the haemodynamics response to extubation was significanlty attenuated.

- The rescue analgesics requirement within 24hours was significantly decreased in group **J (0.4 mic / kg / hr** as infusion) as compared to other groups K and L respectively

- There was nil cases observed in the postoperative period for adverse effects such as bradycardia, hypotension, PONV and headache in all the groups.

- ✓ Hence, from the above result and from the observations, it was clear that low dose **(0.4 mic/kg/hr)** Dexmedetomidine infusion was significantly better at maintaining the haemodynamic stability of the patients undergoing laparascopic surgeries , as well as maintaining the analgesia post operatively therefore , decreasing the need for rescue analgesic .

DISCUSSION

Dexmedetomidine is an alpha – 2 agonist which has a selective sedative and analgesic properties.

- In my study, I had done 3 groups (groups J , K ,L) comparing the low dose of Dexmedetomidine of **0.2 mic/kg/hr** and **0.4 mic/kg/hr** and a control group using normal saline.

- Previously to my conducted study , I had done pilot studies using **0.6 mic/kg/hr** and **0.8 mic/kg/hr** but the relative adverse effects of the Dexmedetomidine such Rebound hypertension, Bradycardia, nausea, vomitting, hypotension (peri-operative period) and prolong sedation after extubation were noted.

- Another pilot study was done on **0.2/kg/ hr and 0.4 mic/kg/hr** infusion Dexmedetomidine and found out that the side effects have reduced significantly and in many cases nil were noted.

- ✓ Hence , the study was done for **0.2 and 0.4 mic/kg/hr** and a control group using normal saline was done and the results were noted.

- ➢ The haemodynamics such as pulse rate and mean arterial blood pressure (MAP) were noted.

❖ In all the groups , the saturation was maintained 99 – 100 % .

- ➢ In my study, after 60 cases were done, the 20 cases that show no adverse effects of Dexmedetomidine such as Rebound hypertension, Bradycardia hypotension, vomiting, nausea and prolong sedation after extubation was in all groups

- ➢ In Group K receiving 0.2 mic/kg/hr the effect of Dexmedetomidine on the haemodynamics of the patient, such as MAP and Pulse rate was not very significant as the MAP remains to be elevated as well as pulse rate at all times during the intra operative period.

- In the other Group L (normal saline) ,after intubation and the creation of pneumoperitoneum and with the progression of surgery the haemodynamic stability of the patients were not maintained .

- ✓ After the start of infusion and tracheal intubation the MAP and pulse rate was significantly reduced in group J receiving 0.4 mic/kg/hr infusion as compared to the control group .This finding was significant to the study done by-

- **Kamlesh Kumari Satinder Gombar Dheeraj Kapoor Harpreet Singh Sandhu et al (2015):** [29] They had concluded that administration of a single pre induction intravenous dose of Dexmedetomidine as infusion it significantly attenuates the response such as rise in the Pulse Rate, Mean Arterial Pressure (MAP), until 5 minutes post-intubation. It significantly reduced the dose that was required such as propofol for induction and caused minimum adverse effects.

- After creation and pneumoperitoneum, the MAP and pulse rate of patients receiving **0.4 mic/kg/hr** was significantly reduced as compared to control group thereby creation a suitable haemodynamics for the patients undergoing laparascopic surgeries irrespective of the surgery performed. This finding was consistant with the findings done by –

- ✓ **Sanjana Vinod, Maya Rose Jose et al (2015) [26] :** They had concluded that used of Dexmedetomidine in patients undergoing laparoscopic procedures can produced a good haemodynamic stability . i.e stable mean BP and heart rate after intubation .

Furthermore, after extubation, the extubation response in pulse rate and MAP was reduced .

- Moreover, the post operative requirement of analgesics (inj. diclofenac 1.5 mg/kg im), was significantly lesser in **Group J** as compare to other groups

- In Group J, 1st rescue analgesia was given after **239 .35 mins** with mean and standard deviation **239.35±16.375 p value = 0.0001** ($p<0.005$)

- In Groups K **160.7 mins** with mean &standard deviation **160.7±4.589**

- Group L was **44.3 mins** with mean & standard deviation **44.3 ±14.978 .**

  - ✓ In 24 hours the total rescue analgesic given to patients was minimal in Group J as compared to the other groups Group J was **80±10.26**, which was significantly less amount with **p value = 0.0001** comparing with Group K **115±18.848** and Group L **172.5±7.695.**

- ✓ The result obtained in **Group J receiving 0.4 mic/kg/hr** infusion, the requirement of rescue analgesics and total analgesics was significanlty reduced as compared to the control group and this finding was consistant with the study done by -

- ✓ **Jasbir Kaur, Amarjit Singh, SS Parmar, Gurpreet Singh, Sukhminder Jit Singh Bajwa Ashish Kulshrestha, Sachin Gupta, Veenita Sharma, Aparajita Panda et al (2012) [30] :** They had concluded that Dexmedetomidine is an excellent drug as it not only decreased the magnitude of haemodynamic stress response to tracheal intubation, surgery and extubation but also it decreased the dose of opioids (analgesics) requirement and isoflurane needed in achieving adequate analgesia post operatively .

- ➢ In all the patients in my study , no adversed side effects such as rebound hypertension , vomitting , hypotension, bradycardia, dryness of mouth, and nausea were noted.

- Other adverse effects include fever, arrhythmias like atrial fibrillation, edema, myocardial infarction, pulmonary edema, speech disorders, diarrhoea, hyperkalemia, hyperglycemia, muscle weakness, paraesthesia, delirium, hallucinations, depression, urinary retention, hypoxia, hypercapnia, hypoventilation, pulmonary hypertension, pneumothorax, erythematous rashes and visual disturbances were not present.

CONCLUSION

From the above study, I conclude that the ideal low dose of Dexmedetomidine of **0.4mic/kg/hr** compared to 0.2 mic/kg/hr was found to be better in maintenance of the haemodynamic stability in patients undergoing laparoscopic surgeries. Moreover the post operative requirement of rescue analgesics is also significantly lower **in 0.4 mic/kg/hr** (Group J) than 0.2 mic/kg/hr.(Group K).

Hence, **0.4 mic/kg/hr** infusion of Dexmedetomidine is the ideal dose to attenuate the stress response of laparoscopic surgeries.

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APPENDIX

ஆராய்ச்சி ஒப்புதல் கடிதம்

ஆராய்ச்சி தலைப்பு

செங்கல்பட்டு அரசு பொது மருத்துவமனையில் லேப்ரோஸ்கோப்பிக் அறுவை சிகிச்சையில் குறைந்த அளவில் டெக்ஸ்மெட்டோமெடின் மயக்க மருந்து கொடுப்பதனால், அதனால் உண்டாகும் பயணகள், உடல் ரீதியாலும், மனரீதியாலும் உருவாகும் விளைவுகள் பற்றிய ஒப்பிட்டு ஆய்வு.

ஆய்வாளர்கள் :

Dr.ஜெர்மாய கர்சீங் P.G.MD

Dr.பாஸ்கர் MD, DA,

இடம் :

செங்கல்பட்டு மருத்துவக் கல்லூரி மருத்துவமனை.

திரு/திருமதி._____

_____

என்ற விலாசத்தில் வசிக்கும் நான் எனக்கு அளிக்கப்பட்ட தகவல் படிவத்தில் உள்ள விஷயங்களை படித்தும் கேட்டும் புரிந்துக் கொண்டேன்.

இந்த ஆய்விற்கு தேவையான பரிசோதனைகளுக்கு உட்பட சம்மதிக்கிறேன்.

இந்த ஆராய்ச்சியில் பிறரின் நிர்பந்தமின்றி என் சொந்த விருப்பத்தின் பேரில் நான் பங்கு பெறுகிறேன்.

ஆய்வில் தொடர்ந்து பங்கு பெற விருப்பமில்லை என்றால் விலகி கொள்ளலாம் என்றும் அறித்துக் கொண்டேன்.

ஆய்வின் முடிவினை சொந்த அடையாளங்களை வெளியிடாமல் பயன்படுத்திக் கொள்ள சம்மதிக்கிறேன்.

நோயாளின் பெயர் :	கையொப்பம்	நாள்
நடுநிலை சான்றாளரின் பெயர் :	கையொப்பம்	நாள்
ஆராய்ச்சியாளரின் பெயர் :	கையொப்பம்	நாள்

PROFORMA

Name :

Age /sex:

IP no :

Contact no:

Diagnosis :

Surgery :

Weight :

PR:

BP:

CVS:

RS:

ABDOMEN:

CNS:

Mallampati classification class:

ASA PS class :

Investigations :

Hb:

TC

DC

Platelets

RFT:

Urine routine:

ECG:

CXR:

Electrolytes:

Others :

Premedication :

Drugs given :

PR and MAP -before starting infusion.,15mins after starting infusion , 1min after induction/laryngoscopyand intubation.,1min after pneumoperitoneum-1min after release of pneumoperitoneum, 1min after extubation.

VAS and RSS

Time of first rescue analgesia given:

Other side effects:

MASTER CHART

sl.no	Name	Age/sex	Ip no.	Diagnosis	Plan	Weight (kgs)	Asaps	Duration of surgery (mins)	Duration of anaesthesia (mins)
1	Sumithma	20y/f	19013	Acute appendicitis	Laparascopic appendicectomy	42kg	1	70	80
2	Dhanush	23y/m	17931	Acute appendicitis	Laparascopic appendicectomy	67kgs	1	62	72
3	Ajith kumar	21y/m	17890	cholelithiasis	Laparascopic cholecystectomy	50kgs	1	53	63
4	Kamala	20y/f	32989	Acute appendicitis	Laprascopic appendicectomy	51kgs	1	53	63
5	Suganthala	55y/f	32673	Cholelithisis	Laparascopic cholecystectomy	50kgs	2	75	85
6	Bala murugasan	32y/m	33040	Cholelithiasis	Laparascopic cholecystectomy	60kgs	2	73	84
7	Rajasudha	23y/f	34304	Acute appendicitis	Laparascopic appendicectomy	41 kgs	1	63	73
8	Princy	20y/f	35507	Acute appendicitis	Laparascopic appendicictomy	52kgs	1	53	62
9	Sekar	57y/m	34870	Cholelithiasis	Laprascopic cholecystectomy	80kgs	2	72	84
10	loganathan	36y/m	34309	Pseudocyst of pancrease	Diagnostic laparascopic surgery.	51kgs	2	72	83
11	Pavithra	18y/f	34189	Cholelithiasis	Laparascopic cholecystectomy	45kgs	1	71	81

sl.no	Name	Age/sex	Ip no.	Diagnosis	Plan	Weight (kgs)	Asaps	Duration of surgery (mins)	Duration of anaesthesia (mins)
12	Balaji	20y/m	36287	Acute appendicitis	Laparascopic appendicectomy	56 kgs	1	74	84
13	Saranya	25y/m	36531	Subacute appendicitis	Laparascopic appendicectomy	45kgs	1	63	74
14	Saraswathy	37y/f	36690	Recurrent appendicitis	Laparascopic appendicectomy	55kgs	2	43	53
15	Revathy	25y/f	37665	Subacute appendicitis	Laparascopic appendicectomy	52kgs	1	66	71
16	Mariyammal	50y/f	36501	Cholelithiasis	Laparascopic cholecystectomy	51kgs	2	75	84
17	Parthiban	19y/m	37292	Acute appendicitis	Laparascopic appendicectomy	50kgs	1	70	82
18	Parkoel	37y/f	38352	Subacute appendicitis	Diagnostic laparascopic surgery	60kgs	1	70	81
19	Kausalya	40y/f	38892	Acute appendicitis	Laparascopic appendicectomy	51kgs	2	63	74
20	Saranya	26y/f	40661	Acute appendicitis	Laparascopic appendicectomy	45kgs	1	64	74
21	Anuradha	30y/f	38400	RIF pain	Diagnostic laparascopic surgery	50kgs	1	75	86
22	Prakash	23y/m	40682	Acute appendicitis	Laparascopic appendicectomy	56kgs	1	59	69
23	Satish kumar	18y/m	41799	Subacute appendicitis	Laparascopic appendicectomy	45kgs	1	68	78
24	Jayathri	37y/f	80988	Chronic RIF pain	Diagnostic laparascopic surgery	45kgs	1	87	97

sl.no	Name	Age/sex	Ip no.	Diagnosis	Plan	Weight (kgs)	Asaps	Duration of surgery (mins)	Duration of anaesthesia (mins)
25	Agaramuthararan	21y/m	42112	Subacute appendicitis	Laparasocpic appendicectomy	47kgs	1	58	68
26	Sugantha	32y/f	44187	Cholelithiasis	Laparascopic cholecystectomy	50kgs	1	79	89
27	Latha	36y/f	4374	Subacute appendicitis	Laparascopic appendicectomy	54kgs	1	46	56
28	Ajith	23y/f	15013	Acute appendicitis	Laparascopic appendicectomy	42kg	1	62	72
29	kumar	32y/m	33931	Acute appendicitis	Laparascopic appendicectomy	67kgs	1	65	76
30	Permal	20y/m	54890	cholelithiasis	Laparascopic cholecystectomy	50kgs	1	69	79
31	Kamatchi	20y/f	323989	Acute appendicitis	Laprascopic appendicectomy	51kgs	1	50	60
32	Aiya	32y/f	322673	Cholelithisis	Laparascopic cholecystectomy	50kgs	2	82	90
33	selvam	24y/m	323040	Cholelithiasis	Laparascopic cholecystectomy	60kgs	2	81	90
34	ranjani	22y/f	231304	Acute appendicitis	Laparascopic appendicectomy	41 kgs	1	58	68
35	Loganatham	30y/m	443507	Acute appendicitis	Laparascopic appendicictomy	52kgs	1	44	54
36	Sekar	57y/m	34870	Cholelithiasis	Laprascopic cholecystectomy	80kgs	2	78	90
37	Ajith	26y/m	654309	RIF pain	Diagnostic laparascopic surgery.	51kgs	2	78	90

sl.no	Name	Age/sex	Ip no.	Diagnosis	Plan	Weight (kgs)	Asaps	Duration of surgery (mins)	Duration of anaesthesia (mins)
38	Kalaivani	23y/f	231189	Cholelithiasis	Laparascopic cholecystectomy	45kgs	1	82	98
39	sarikala	30y/m	36287	Acute appendicitis	Laparascopic appendicectomy	56 kgs	1	60	70
40	varanya	32y/m	23653	Subacute appendicitis	Laparascopic appendicectomy	45kgs	1	53	65
41	Saraswathy	37y/f	36690	Recurrent appendicitis	Laparascopic appendicectomy	55kgs	2	55	65
42	Pushpa	22y/f	47665	Subacute appendicitis	Laparascopic appendicectomy	52kgs	1	50	60
43	Sugantha	30y/f	236501	Cholelithiasis	Laparascopic cholecystectomy	51kgs	2	88	98
44	mari	19y/m	37292	Acute appendicitis	Laparascopic appendicectomy	50kgs	1	50	60
45	Parkoel	37y/f	38352	Subacute appendicitis	Diagnostic laparascopic surgery	60kgs	1	52	64
46	Kausalya	40y/f	38892	Acute appendicitis	Laparascopic appendicectomy	51kgs	2	60	65
47	Saranya	26y/f	40661	Acute appendicitis	Laparascopic appendicectomy	45kgs	1	56	67
48	Bharathi	34y/f	38400	RIF pain	Diagnostic laparascopic surgery	50kgs	1	70	80
49	Prakash	23y/m	40682	Acute appendicitis	Laparascopic appendicectomy	56kgs	1	56	65
50	Suresh	21y/m	51799	Subacute appendicitis	Laparascopic appendicectomy	45kgs	1	67	79

sl.no	Name	Age/sex	Ip no.	Diagnosis	Plan	Weight (kgs)	Asaps	Duration of surgery (mins)	Duration of anaesthesia (mins)
51	Sarikala	32y/f	30988	Chronic RIF pain	Diagnostic laparascopic surgery	45kgs	1	88	98
52	Palani	23y/f	32112	Subacute appendicitis	Laparasocpic appendicectomy	47kgs	1	52	60
53	Deepa	32y/f	23187	Cholelithiasis	Laparascopic cholecystectomy	50kgs	1	87	96
54	abuthajith	34y/f	4574	Subacute appendicitis	Laparascopic appendicectomy	54kgs	1	56	65
55	Kamutha	38y/f	84352	Acute appendicitis	Laparascopic appendicectomy	51kgs	2	49	56
56	Kausalya	40y/f	38892	Acute appendicitis	Laparascopic appendicectomy	45kgs	1	53	60
57	Kavitha	27y/f	40661	RIF pain	Diagnostic laparascopic surgery	50kgs	1	89	98
58	amuljothi	34y/f	43400	Acute appendicitis	Laparascopic appendicectomy	56kgs	1	56	65
59	Prem kumar	24y/m	50682	Subacute appendicitis	Laparascopic appendicectomy	45kgs	1	55	60
60	Nithya	29y/f	44501	Chronic RIF pain	Diagnostic laparascopic surgery	45kgs	1	89	98

Group J = serial no. 1 to 20 - dexmedetomidine infusion of 0.4 mcg/kg/hr.

Group k = serial no 21 to 40 - dexmedetomidine infusion of 0.2 mcg/kg/hr.

Group L = serial no. 41 to 60 - normal saline infusion.(control group).

	MEAN ARTERIAL PRESSURE (MAP)										
	Patient no.	**Before starting infusion .**	**15 minutes after starting infusion.**	**1minute after induction,after laryngoscopy and intubation.**	**After pneumoperitoneum. (minutes)**					**After release of pneumoperitoneum. 1min.**	**After extubation 1min.**
					1min	**15 min**	**30min**	**45 min**	**60 min**		
Grp J Dex 0.4	**1**	98	87	90	80	91	92	90	90	88	99
	2	99	89	90	84	92	91	94	91	87	99
	3	100	78	80	87	97	96	94	94	89	91
	4	90	78	83	89	95	95	93	91	90	99
	5	97	80	84	85	100	97	93	93	88	99
	6	90	78	80	83	94	91	97	94	89	98
	7	98	77	81	87	98	94	94	93	89	96
	8	99	87	89	82	93	96	94	94	80	94
	9	97	89	90	89	98	99	96	91	90	98
	10	95	86	90	85	97	99	95	97	91	99
	11	93	78	88	83	95	97	92	92	92	94
	12	99	80	85	87	94	97	98	98	89	90
	13	91	84	85	84	98	98	93	96	80	100
	14	98	80	87	82	95	99	91	93	92	99
	15	94	75	80	87	94	91	94	92	91	98
	16	100	75	86	84	93	91	94	93	89	97
	17	93	79	80	82	98	97	95	91	80	99

	18	90	76	80	84	99	99	97	93	93	98
	19	80	65	69	85	100	99	94	97	93	98
	20	89	78	79	87	95	96	98	95	90	99
Group K Dex 0.2	**21**	96	90	100	105	100	104	105	105	93	98
	22	95	90	98	100	109	104	102	104	93	100
	23	87	80	84	94	99	100	103	105	95	100
	24	77	78	89	95	98	97	100	96	96	104
	25	70	70	79	93	90	94	100	99	98	109
	26	94	90	99	99	99	100	104	104	96	108
	27	98	95	99	95	96	104	100	105	104	100
	28	87	83	90	103	99	100	99	104	97	105
	29	90	84	99	103	105	104	98	105	98	109
	30	99	92	100	94	98	100	98	100	99	110
	31	95	90	98	96	99	100	99	104	93	105
	32	87	83	97	96	101	104	96	104	94	106
	33	80	79	81	97	110	103	97	103	100	109
	34	78	75	80	98	110	110	96	100	93	109
	35	79	75	80	91	99	102	100	99	105	109
	36	75	75	82	102	99	101	103	101	104	110
	37	97	95	100	105	98	100	100	100	98	103
	38	90	87	99	102	102	103	101	102	99	106
	39	96	90	100	96	100	104	102	101	89	108

	40	90	87	98	97	102	104	102	102	97	100
Group K NS	**41**	99	98	103	110	110	95	102	105	107	110
	42	78	80	100	101	109	105	102	103	103	110
	43	98	97	109	103	103	104	105	104	100	111
	44	78	80	99	109	109	105	100	103	105	109
	45	79	80	104	105	107	105	104	103	108	109
	46	89	90	105	108	100	104	104	104	110	108
	47	89	89	99	110	111	105	96	103	104	109
	48	89	90	100	104	104	105	109	104	104	106
	49	90	90	105	104	106	103	103	103	105	102
	50	96	97	107	103	106	106	103	103	105	109
	51	98	97	106	106	110	110	101	104	104	106
	52	94	95	100	109	110	110	103	104	105	106
	53	95	97	109	106	109	105	104	103	104	109
	54	95	95	108	110	110	103	104	104	105	106
	55	89	90	99	109	110	104	105	100	103	107
	56	78	76	97	110	109	103	105	104	107	106
	57	90	88	102	106	109	110	104	102	104	107
	58	89	90	103	103	110	103	103	103	109	107
	59	76	76	101	106	110	105	105	104	108	109
	60	89	90	105	110	111	104	105	103	104	108

	PULSE RATE (PR)										
	Patient no.	**Before starting infusion.**	**15 minutes after starting infusion.**	**1minute after induction, after laryngoscopy and intubation.**	**After pneumoperitoneum. (minutes)**					**After release of pneumo peritoneum. 1min.**	**After extubation 1min.**
					1min	**15 min**	**30min**	**45 min**	**60 min**		
Group J Dex 0.4	**1**	90	80	80	89	77	76	77	75	76	83
	2	93	80	89	90	78	76	78	76	78	82
	3	100	81	87	98	79	78	79	78	76	84
	4	90	87	84	94	70	74	78	87	78	83
	5	97	80	83	98	76	78	80	85	76	84
	6	90	82	82	97	74	80	77	74	78	82
	7	91	84	87	89	73	80	76	73	77	87
	8	96	82	86	80	78	85	79	77	76	87
	9	97	84	89	98	79	80	70	78	74	87
	10	95	84	84	90	70	87	80	79	76	90
	11	93	87	82	90	80	84	84	70	78	85
	12	94	80	83	93	81	82	84	76	80	86
	13	91	84	84	91	87	81	77	75	81	83
	14	98	82	85	94	84	87	81	76	78	82
	15	94	81	87	98	79	89	78	77	80	85
	16	90	83	83	96	81	79	78	78	83	83

	17	93	85	85	94	79	70	81	79	87	86
	18	90	87	84	92	70	84	83	78	84	82
	19	80	83	87	95	76	81	79	81	87	84
	20	89	87	87	97	74	82	83	83	87	82
Group K Dex 0.2	**21**	96	81	89	94	72	83	89	84	76	85
	22	95	82	82	98	78	87	87	78	74	87
	23	87	82	89	90	79	84	85	79	87	87
	24	77	83	85	95	70	81	80	77	89	98
	25	70	81	83	97	75	87	82	79	98	97
	26	94	83	85	91	71	84	84	80	87	97
	27	95	82	87	04	80	87	86	89	87	80
	28	87	81	89	90	84	87	85	87	88	98
	29	90	83	89	97	83	87	84	84	89	99
	30	99	84	80	98	88	87	83	82	80	96
	31	95	85	85	98	70	88	84	79	87	95
	32	87	83	83	90	78	98	82	80	89	96
	33	80	84	81	96	80	98	84	82	80	98
	34	78	82	89	99	89	78	81	84	90	97
	35	79	82	87	97	85	87	84	83	99	94
	36	75	84	89	95	83	87	85	86	98	93
	37	97	83	85	92	82	89	83	82	95	92
	38	90	84	84	95	84	98	81	81	94	91
	39	96	82	83	96	84	87	88	89	87	93

	40	90	83	84	98	98	78	86	84	86	95
Group LNS	**41**	99	83	84	93	99	100	88	89	85	93
	42	78	84	81	94	99	100	89	88	99	91
	43	98	85	84	90	90	121	90	90	90	100
	44	78	87	87	99	99	101	92	90	98	103
	45	79	88	84	98	100	110	88	98	100	105
	46	89	77	87	100	102	109	87	97	102	104
	47	89	87	89	104	107	107	89	96	103	104
	48	89	89	85	107	109	106	80	89	99	104
	49	90	89	83	100	106	105	90	87	98	110
	50	96	87	85	102	109	111	90	88	97	121
	51	98	84	87	110	107	100	92	95	97	100
	52	94	89	84	121	100	109	91	90	109	105
	53	95	89	82	131	98	99	97	94	105	104
	54	95	89	87	100	99	90	90	100	102	106
	55	89	89	87	109	117	99	99	111	100	106
	56	78	89	83	110	118	110	110	99	98	105
	57	90	90	84	100	109	109	111	94	97	107
	58	89	87	87	109	100	109	100	98	98	109
	59	76	87	86	107	111	103	98	96	99	109
	60	89	89	85	107	109	110	98	99	95	110

Changes in mean sedation score (Post operative)

	RAMSAY SEDATION SCORE						
	Patient number.	**1min**	**15mins**	**30mins**	**45mins**	**60mins**	**120mins**
Group J Dex 0.4	**1**	3	2	2	2	2	2
	2	4	2	2	2	2	2
	3	3	2	2	2	2	2
	4	4	2	2	2	2	2
	5	3	2	2	2	2	2
	6	3	2	2	2	2	2
	7	3	2	2	2	2	2
	8	4	2	2	2	2	2
	9	3	2	2	2	2	2
	10	3	2	2	2	2	2
	11	3	2	2	2	2	2
	12	3	2	2	2	2	2
	13	3	2	2	2	2	2
	14	3	2	2	2	2	2
	15	3	2	2	2	2	2
	16	3	2	2	2	2	2
	17	3	2	2	2	2	2
	18	3	2	2	2	2	2

	19	3	2	2	2	2	2
	20	3	2	2	2	2	2
Group K Dex 0.2	**21**	3	2	2	2	2	2
	22	2	2	2	2	2	2
	23	2	2	2	2	2	2
	24	2	2	2	2	2	2
	25	2	2	2	2	2	2
	26	2	2	2	2	2	2
	27	3	2	2	2	2	2
	28	3	2	2	2	2	2
	29	3	2	2	2	2	2
	30	3	2	2	2	2	2
	31	2	2	2	2	2	2
	32	3	2	2	2	2	2
	33	2	2	2	2	2	2
	34	2	1	1	1	1	1
	35	2	2	2	2	2	2
	36	2	2	2	2	2	2
	37	2	2	2	2	2	2
	38	2	2	2	2	2	2
	39	2	2	2	2	2	2

	40	2	2	2	2	2	2
Group L NS	**41**	1	1	1	1	1	1
	42	1	1	1	1	1	1
	43	1	1	1	1	1	1
	44	1	1	1	1	1	1
	45	1	1	1	1	1	1
	46	1	1	1	1	1	1
	47	1	1	2	1	1	1
	48	2	2	2	1	1	1
	49	1	1	1	1	1	1
	50	1	1	1	1	1	1
	51	1	1	1	1	1	1
	52	2	1	1	1	1	1
	53	2	1	1	1	1	1
	54	2	2	2	1	1	1
	55	2	1	1	1	1	1
	56	1	1	1	1	1	1
	57	2	2	1	1	1	1
	58	2	1	1	1	1	1
	59	1	1	1	1	1	1
	60	1	1	1	1	1	1

	VISUAL ANALOGUE SCALE						
	Patient number.	**1min**	**15mins**	**30mins**	**45mins**	**60mins**	**120mins**
Group J Dex 0.4	**1**	1	1	1	1	1	2
	2	1	1	1	1	1	2
	3	1	2	2	2	2	2
	4	1	1	1	2	2	2
	5	2	2	2	2	2	2
	6	2	2	2	2	2	2
	7	2	2	2	2	2	2
	8	2	2	2	2	2	2
	9	3	3	3	3	3	4
	10	3	3	3	3	3	4
	11	1	1	1	2	2	3
	12	1	1	1	2	2	3
	13	1	1	1	1	2	3
	14	1	1	1	2	2	2
	15	2	2	2	2	2	2
	16	2	2	2	2	2	2
	17	2	2	2	2	2	2
	18	2	2	2	2	2	2
	19	2	2	2	2	2	2

	20	2	2	2	2	2	2
Group K Dex 0.2	**21**	3	3	3	4	4	4
	22	3	3	3	3	3	3
	23	3	3	3	3	3	3
	24	4	4	4	4	4	4
	25	3	3	3	3	3	3
	26	3	3	3	3	3	3
	27	3	3	3	3	3	3
	28	3	3	3	3	3	3
	29	3	3	3	3	3	3
	30	3	3	3	3	3	3
	31	2	2	2	2	2	2
	32	3	3	3	3	3	3
	33	2	2	2	2	2	4
	34	2	2	2	2	2	2
	35	2	2	2	2	2	2
	36	2	2	2	2	2	2
	37	2	2	2	2	2	2
	38	2	2	2	2	2	2
	39	2	2	2	2	2	2
	40	2	2	2	2	2	2

Group L NS	**41**	4	4	4	4	4	4
	42	3	3	3	3	3	3
	43	3	3	3	4	4	4
	44	3	3	4	4	4	4
	45	4	4	4	4	4	4
	46	4	4	4	4	4	4
	47	4	4	4	4	4	4
	48	3	3	3	3	3	4
	49	3	3	3	3	3	4
	50	2	2	2	2	2	3
	51	3	3	3	3	3	3
	52	3	3	3	4	4	4
	53	4	4	4	4	4	4
	54	3	3	3	3	3	4
	55	3	3	3	3	3	4
	56	3	3	3	3	3	4
	57	4	4	4	4	4	4
	58	4	4	4	4	4	4
	59	4	4	4	4	4	4
	60	4	4	4	4	4	4

	POST ANALGESIC REQUIREMENT		
	Patient number.	**Time for first rescue analgesics requirement (in mins)**	**Cumulative analgesia requirement in 24 hours (in mg)**
GROUP J DEX 0.4	1	249	100
	2	240	100
	3	250	75
	4	200	100
	5	234	75
	6	245	75
	7	267	75
	8	213	75
	9	233	75
	10	222	75
	11	212	75
	12	240	75
	13	250	100
	14	245	75
	15	247	75
	16	259	75
	17	246	75
	18	245	75

	19	245	75
	20	245	75
GROUP K DEX 0.2	21	160	100
	22	150	125
	23	159	125
	24	160	125
	25	163	100
	26	163	125
	27	169	125
	28	150	125
	29	159	125
	30	160	100
	31	156	125
	32	162	100
	33	165	125
	34	163	125
	35	159	75
	36	164	125
	37	162	100
	38	163	75
	39	163	125
	40	164	150

GROUP L NS	41	50	175
	42	55	175
	43	50	175
	44	56	150
	45	50	175
	46	55	175
	47	54	175
	48	53	175
	49	52	175
	50	56	175
	51	50	175
	52	50	175
	53	49	175
	54	30	175
	55	30	175
	56	20	150
	57	12	175
	58	10	175
	59	50	175
	60	54	175